First Look: AST's Budget-Priced 486 Line

PC WORLD

OCTOBER 1992 $3.95

TEST REPORT: 24 NEW 486s

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35 Printers for Office-Size Jobs

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9 Easy Packages for Under $250

NEC introduces CD-ROM with MultiSpin.™

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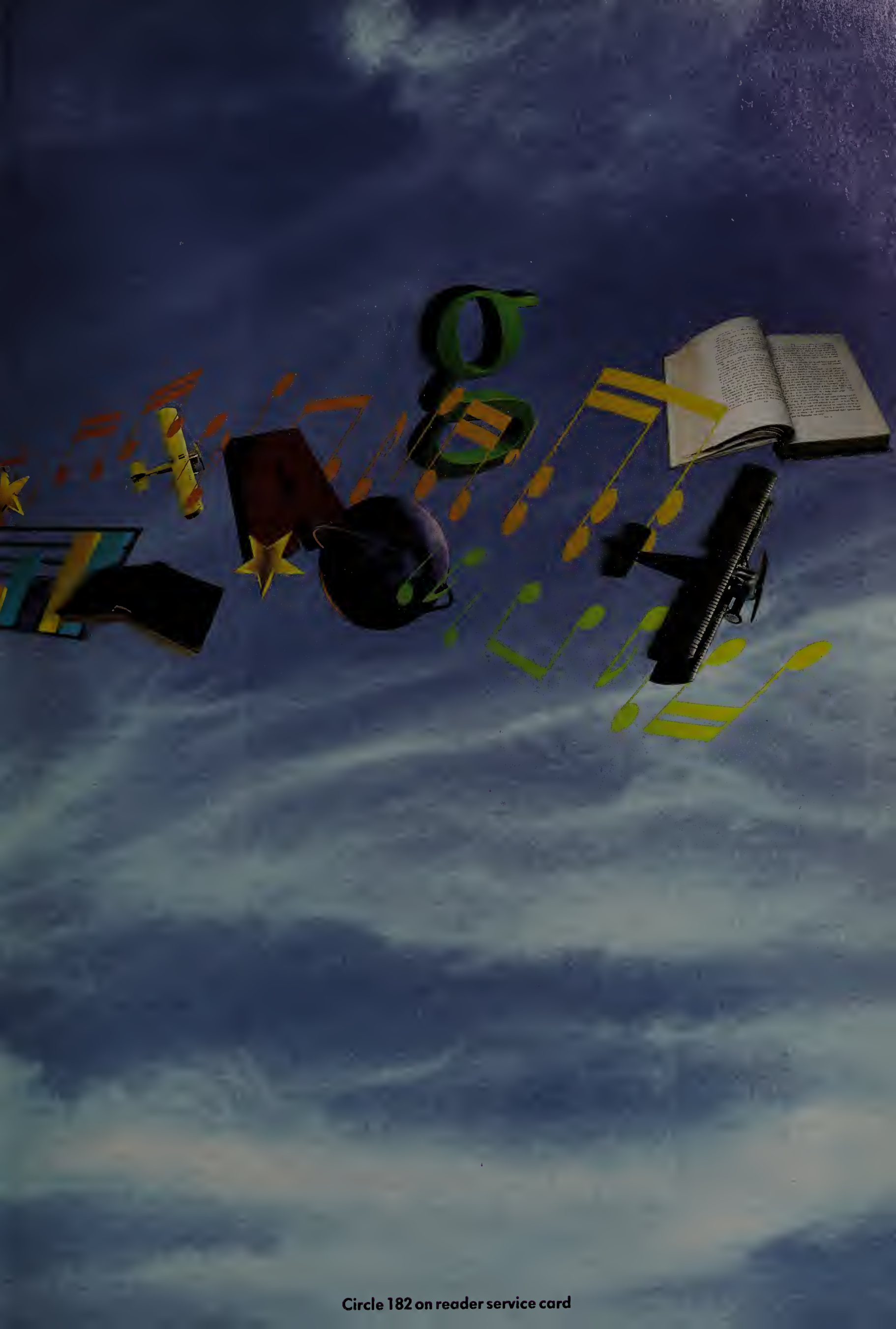

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OCTOBER 1992
VOLUME 10
NUMBER 10

PC WORLD

486 Free-fall: Blazingly fast, 50-MHz 486DX2 systems sell for under $2500 on the street, with prices still dropping at press time.

Cover photograph by Robert Cardin

Digital compositian by Varitel Select

COVER STORY

486DX2 Systems: Maximum Price-Performance

108/ Among the fastest PCs you can buy, the new 50-MHz 486DX2 systems are also surprisingly affordable—only $100 to $200 more than 33-MHz 486DXs. Our tests of 24 DX2 speed demons turned up two clear winners, one of which goes for just under $2700 fully loaded. By the time you read this, these hot sellers will probably cost even less.

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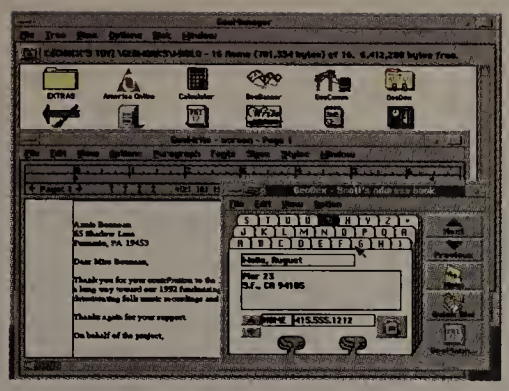

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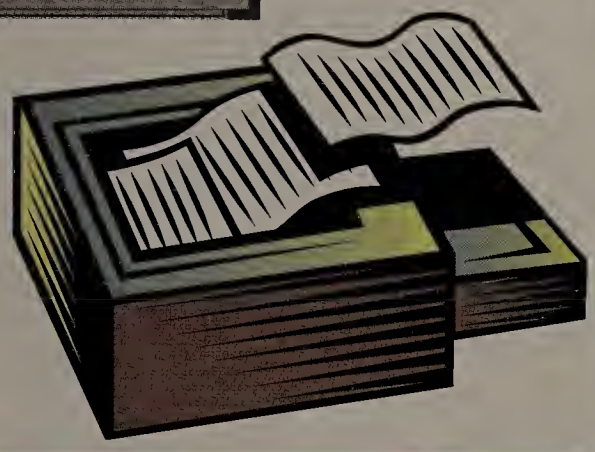

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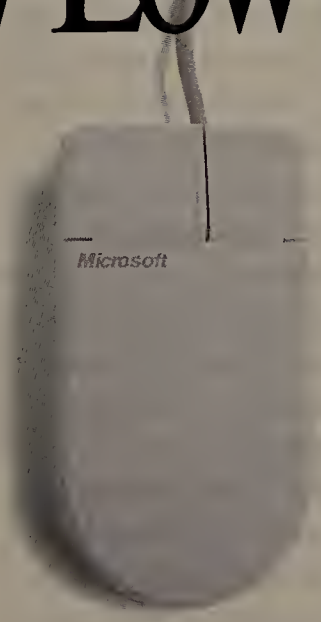

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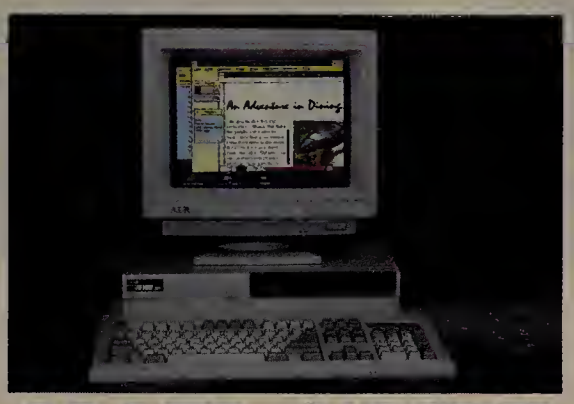

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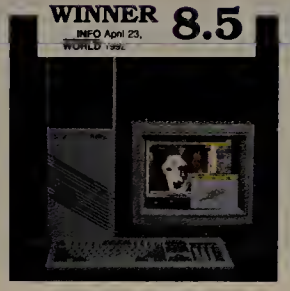

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cc:Mail allows you to send messages transparently and maintains a consistent set of features across all these major platforms. That's because it was built from the ground up to support network environments made up of different platforms and LANS – a design consideration that seems to elude most e-mail systems. Further, it's the only system that gives you a wide range of options for enterprise-wide connectivity. cc:Mail can even exchange mail messages with most mini and mainframe mail systems such as IBM® PROFS® and offers gateways to public e-mail services such as MCI Mail.® And cc:Mail runs smoothly on any server or network operating system, in any configuration. All of which makes it easier for you to maintain, administer, and install. And put your faith in.

cc:Mail offers an impressive set of administration tools. Such as Automatic Directory Exchange, a product which automatically collects any changes

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ic mail package roval from everyone.

made to the directory and updates the entire network. It's also the first package of its kind that's built on a new, fully scalable messaging architecture. Which means it can accommodate 5 to 500,000 users. And grow along with your business. One more thing: cc:Mail has won every major industry award, including the Windows Magazine 1992 WinAward and ComputerWorld's 1992 LAN Brand Preference award.

INFO WORLD PRODUCT OF THE YEAR 1991

So if you're looking to standardize your e-mail system, look to cc:Mail, the award-winning system that gives you enterprise-wide connectivity, scalability and reliability—the kind nearly 2 million people count on every day.

1992 BYTE READERS' CHOICE AWARD

For a free demo disk of the cc:Mail Macintosh,® Windows,™ UNIX,® or DOS Platform Pack, **call us at 1-800-448-2500.**

With all the stamps of approval we've received, we're still missing one very important one: yours.

Lotus cc:Mail

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Other hand scanners.

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Circle 21 on reader service card

Read It and Win a 2.7-Pound Portable

If you're not using *Windows* and don't want to, can you compute happily without it and still escape the limitations of MS-DOS? If you are using *Windows,* are you missing out on something? Contributing Editor Scott Spanbauer examines four alternatives to *Windows* and reports his findings in "Windows Alternatives" on page 170. His observations on *Desqview, Desqview/X, GeoWorks Pro,* and OS/2 2.0 will help you select the computing environment that's best for you.

In the fast-changing race to build better, cheaper, faster PCs, we think systems built around Intel's DX2 processor are the best price/performance choices today. For our review on page 108, we tested 24 DX2-based systems and selected two can't-miss Best Buys. We also answer the question: Do video accelerators and caching disk controllers improve DX2 system performance in real business applications, or is the DX2 so fast you don't need these other enhancements?

James Crowder in front of the West Virginia Capitol, left. Morris Fendley on the University of Georgia campus, right. Both won PC World Best Buy products by faxing us their ratings of our articles.

LEFT, MANUELLO PAGANELLI; RIGHT, ANN STATES

The paperless office is a fond but unrealized dream. Who wouldn't want their correspondence, documents, and records automatically scanned in, indexed, and searchable? But we're still shuffling papers and yanking file drawers because computers have failed to deliver the paperless office. Have the necessary technologies come of age? We decided to investigate some PC-based approaches to making the office more electronic. Find out in "The Less-Paper Office" on page 186 whether the electronic office is happening without you.

After you read these articles and others in this issue, please let us know what you think of them. We've provided a convenient form for this purpose on page 275. When you send in the form, you automatically enter a contest to win a product that we know from our research many of you would love to own. This month we're pleased to offer the most valuable prize yet—the lightest, fully typeable notebook computer we've found to date, the Gateway 2000 HandBook. At only 2.7 pounds with a 40MB hard drive, a backlit screen, and Chips and Technologies' 286-class PC/Chip microprocessor, the HandBook is powerful enough for many on-the-road tasks and light enough to take everywhere you go. You can find more information about the HandBook on page 54 of our August issue .

Some PC World Readers Who Faxed and Won

Thanks for the fax-back feedback that so many thousands of you have sent. Your faxed opinions help us improve the magazine rapidly to serve your needs better. We thought you would enjoy meeting some of the readers who have won prizes since we introduced the poll last May.

James L. Crowder of Walton, West Virginia, responded to the poll in our May issue and won an Epson Action-Laser II, a Best Buy in our April review of personal laser printers. Crowder uses PCs both at work for the state of West Virginia, where he is a security expert, and at his home. The Crowder family is active in scouting and is looking forward to using the printer to spruce up the scouting newsletter they produce.

Morris Fendley of Athens, Georgia, participated in our June poll and won an NEC Intersect CDR-73M, a Best Buy in our May review of CD ROM drives. Fendley, a premed student at the University of Georgia in Athens, works part-time at the Environmental Protection Agency. He writes his school papers with the DOS version of *WordPerfect* and plans to try *Automap* and *Microsoft Bookshelf* on his new CD ROM drive.

You, too, can win if you take a few minutes to respond to the fax-back survey on page 275. We'll gain the information we need to improve *PC World,* and you may win a dandy mobile computer that will speed you up without weighing you down.

Phil Lemmons

PHIL LEMMONS
EDITOR IN CHIEF

AN INEXPENSIVE PC THA
FROM THE COMPANY T

What happens when the best computer engineers in the world design a low-priced desktop PC? You get the new COMPAQ ProLinea Line of PCs, perhaps the best value PCs in the world. What happens when a clone maker designs a low-priced PC? You get what you pay for.

When Compaq engineers set out to build an affordable, full performance desktop PC with all the essential features, there were a lot of options to choose from.

We could have bought an existing low-end computer company.

We could have farmed out all manufacturing.

We could have bought parts from the cheapest vendor in town.

But then all we would have ended up with is simply another inferior,

†This service is provided by contracted Service Providers and may not be available in certain geographic locations. Contact the Compaq Customer Support Center for further details. *Suggested retail price; reseller price will vary; monitor not included; price indicated is for COMPAQ ProLinea 3/25zs Model 40, not pictured here. © 1992 Compaq Computer Corporation.

T'S AS GOOD AS A COMPAQ. HAT OUGHT TO KNOW.

low-priced clone. And what we wanted was a low-priced COMPAQ computer.

Which is what you told us you wanted.

So through some high levels of chip integration and some equally high levels of engineering, design and just plain common sense, we've cut costs in system design and manufacturing.

While still managing to deliver 100 percent of the virtues you've come to expect from Compaq.

You can choose from five different models, ranging from 386SX/25 to full 486DX2/50 processing power.

So whether it's expansion, storage, processing speed or a small footprint that you're most concerned with, there's a model perfectly suited to your needs.

And each comes with a high-resolution 1024 x 768 video system.

Most importantly, the new COMPAQ ProLinea PCs are backed not only by the assurance of the COMPAQ name, but also by CompaqCare, our new service and support program. Which includes a free one-year, on-site† limited warranty, and a host of other services.

And to go along with our new line of PCs, there's a whole new line of places you can find them. Give us a call for more details.

In the U.S., call us at 1-800-345-1518, ext. 215, and in Canada, just call 1-800-263-5868, ext. 215.

We think you'll be pleasantly surprised at exactly how much the COMPAQ ProLinea PCs have to offer.

And equally surprised by how little we're able to offer them for.

Intel 386SX/25 ≪ small footprint ≪ 2 MB RAM ≪ 2 ISA slots ≪ 2 drive bays ≪ 40- or 84-MB hard drive
Intel 386SX/25, 486SX/25, 486/33, 486DX2/50 ≪ 2 or 4 MB RAM ≪ 3 ISA slots ≪ 3 drive bays ≪ 84- to 240-MB hard drive options
All COMPAQ ProLinea models include high-resolution 1024 x 768 video and pre-installed Microsoft MS-DOS 5.0 as published by Compaq

With the COMPAQ ProLinea Line of PCs, you can choose from 386SX/25 to 486DX2/50 processing power.

All of our models are backed by CompaqCare, our comprehensive new service and support program. For details, just call 1-800-345-1518.

The COMPAQ ProLinea PCs start at just $899. Its introduction shook the industry, with PC WEEK affirming that we had "slashed prices without compromising quality."*

COMPAQ

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Circle 47 on reader service card

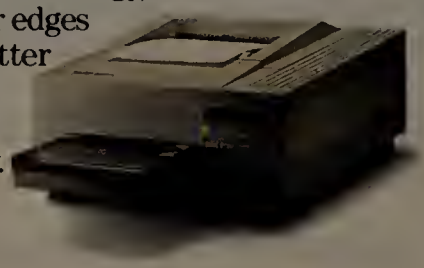
"I haven't taken a LaserJet in for repairs once in seven years."

—Clyde Alpert, ARL Services Inc., Chicago, IL

"I repair other printers once, twice, maybe three times a year," says Clyde Alpert. "But I never have to take the LaserJets in. We've pumped thousands and thousands of copies through them, and they've never failed us."

In addition to great reliability, HP also offers exceptional customer support. For example, the LaserJet Customer Assist Line is staffed with experts to advise you after the sale. They'll help you take full advantage of all the HP LaserJet printers' unique features and answer your hardware and software questions.

With five award-winning models, ranging in price from $1,249 to $5,495,* HP offers an unbeatable selection. You can also choose genuine PCL5 printer language, with scalable typefaces. As well as HP's exclusive Resolution Enhancement technology, which creates sharper edges and better overall print quality.



To hear more about what other customers have to say about HP LaserJet printers, remember to call **1-800-752-0900, Ext. 2986** for a free video. Then forget about repairs.

HP LaserJet Printers.

HEWLETT PACKARD

*Suggested U.S. list prices.

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Circle 102 on reader service card

LETTERS

Reactions and responses from the PC World community

Watching OS/2

In response to Peter D. Varhol's "OS/2 2.0 Challenges Windows 3.1" in June, I'd like to comment that, as always, your magazine is well written and unbiased.

For many years I believed IBM could build machines but not produce software for them. Then I attended a conference hosted by IBM to show off OS/2. My computer will never be the same.

WAYNE VINCENT

Varhol said it best: "Would you rather have a 2000-ton space shuttle or a used Chevy . . . ?"

OS/2 2.0 is amazing. I can run a DOS program in one window and a *Windows* program in another and never notice system degradation.

So, this leaves me confused. Why is everyone except Varhol down on this marvel? I read about system resource hogging. Well, I can run OS/2 with 10MB of RAM and not skimp a bit. It's absurd to complain about resource hogging. What *serious* computer user owns a system that's less powerful than what OS/2 needs?

NATHAN EVEN TABLEMAN
BRUNSWICK, MAINE

ANTHONY RUSSO

After reading the favorable reviews of OS/2, I decided to take the plunge. I set aside a week to do the installation, learn the system, and deal with the glitches.

The problems I encountered were so frequent and intractable that today, exactly one week later, I deleted the operating system from my 486/33 and returned the disks.

It was a delight to retrieve 40MB of hard disk space and see my familiar *Desqview* screen.

BRIAN M. ROM
NEW YORK

I would like to congratulate you on your magazine's recent articles on OS/2 2.0. While *PC World* has gone as far as reviewing the new OS/2, most other magazines must feel that a simple mention of the release is sufficient.

My impression of OS/2 is that it's outstanding. After using it for a month, I think it's a giant step above the DOS-*Windows* combination in terms of power and stability. In 30 days I haven't had to reboot my machine a single time—an impossibility when running *Windows*.

I speak for most of the OS/2 community when I thank you for your OS/2 coverage. Don't stop now!

ALAN LIEBOWITZ
CHITTENANGO, NEW YORK

Switching to Windows

"Windows 3.1 Delivers," said the teaser on the cover of your May issue. Inside was a glowing report on Microsoft's latest upgrade. As a desktop publisher, I was particularly interested to read about *3.1*'s TrueType fonts. In retrospect, I wish I'd read between the lines of the *Windows* story in that issue's *Industry Outlook*.

I assumed you took a good look at *Windows 3.1* before giving it such a glowing report. Based on that assumption, I ordered and installed the upgrade. Thus began my journey into what I now call The Upgrade From Hell.

Calls to Microsoft haven't helped. The technical people were nice, and I didn't have to wait long on hold, but the solutions they offered were not encouraging. For example, they suggested turning off *Adobe Type Manager* to solve my screen font problems. This didn't help. I resolved the problems by turning off TrueType—one of your arguments for buying *3.1*.

I'm thinking of switching to OS/2.

MARK FLINT
KNAPPA, OREGON

The author of "Out the Window" in July's *Letters* refers to *Windows* as "a bloated, lame hippo." This attitude on the part of hard-core C> prompt users has always confused me. I used Macintosh computers for many years and switched to PCs specifically because of the *Windows* interface.

Windows' power to transfer and dynamically link graphics and data between applications makes DOS pale in comparison. Macintoshes and *Windows* are happily surviving with millions of users because they are so powerful and are able to do things you just can't do with DOS.

All those hard-core C> prompt users should try *Windows* for a while before passing judgment on it. OS/2 and Windows NT offer promise for the future, but *Windows 3.0* has already convinced

➔

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a lot of people to give up their "toy" Macintoshes and become PC users.

BILL BIERBOWER
TEQUESTA, FLORIDA

A Nicer Print From DOS

I tried Mr. William Ball's tip, "Printing Nice Pages From DOS," in *User Group Tips* in June. When I used the LONGPRNT command on a multipage text file, it printed only one page. So I inserted Pause between 'PRINT NEWFILE' and 'DEL NEWFILE'. This way, the batch file waits for me to hit a key (which I do once the file is printed) before deleting the file.

With this change, Mr. Ball's suggestion was an elegant solution to the problem of text running across page breaks.

JAY ATLAS
POMONA, CALIFORNIA

A Men's Magazine?

I have a question concerning an advertisement that appeared on page 280 in your July issue. It began, "What Kind of Man Reads PC World?"

I've been reading *PC World* for a couple years now and wasn't aware that it was for men only. I apologize for sticking my nose where it obviously doesn't belong (you know how these women of the nineties still haven't learned their place), but you should specify this information on your subscription cards. Can you please refer me to a computer magazine that women read?

DEBBIE LEAHY
VIA COMPUSERVE

Shareware On-Line

Let me congratulate your magazine on your PC World Online forum on America Online.

Many of the programs available on America Online are shareware. Some shareware programs are produced by members of the Association of Shareware Professionals (ASP). This international group of authors, disk vendors, and BBS's supports a number of standards, such as guaranteed minimum product support, and supplies a cus-

➔

tomer advocate to help resolve disputes with ASP members. ASP also works to increase knowledge and acceptance of shareware as valid software.

RICHARD G. HARPER
PRESIDENT
ASSOCIATION OF SHAREWARE PROFESSIONALS
VIA COMPUSERVE

Ask Questions

I recently bought *Data Junction 4.1*, so I read with interest both the June *Update* item on this program and Celeste Robinson's comments on it in July's "The Experts' Favorites." *Data Junction* is a good program, but readers should ask a lot of questions if they have a specific application in mind. I purchased *Data Junction* to convert an *R:BASE* data base to another format. But contrary to ad claims, *Data Junction* won't convert *R:BASE* note fields. Since I was converting a dictionary of industry terms, I ended up with terms and no definitions. The makers of *Data Junction* tell me they may add this feature. I hope they do; it will make *Data Junction* a four-star program.

RON CARPENTER
CONCORD, CALIFORNIA

On the Fast Trax

In "Disk Optimizers" in July's Special Section, you note *FastTrax*'s potential 85MB hard disk limit without expanded memory but fail to mention the potential limits of other products, which cannot be overcome by adding memory. You also state that with 800K of expanded memory and an EMS driver, *FastTrax* "can probably handle a larger disk." Not probably, definitely. Given expanded memory, *FastTrax* can defragment any DOS drive with any combination of files, directories, directory levels, clusters, and file sizes.

Your speed test compares apples and oranges. Since *FastTrax*'s quickest mode can survive a power failure, it's wrong to compare it with other programs running in unsafe mode. Your speed tests should have timed all the products in safe mode, particularly since you recommend using this mode.

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If you can click a mouse, CA Windows software can help you work smarter, faster and more efficiently than you ever thought possible.

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It's as friendly as a spreadsheet, but you can view and model up to 12 dimensions of data with new CA-Compete!™

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Finally, your review ignores the quality of the optimization. *FastTrax* is unique in that it places files within disk cylinder boundaries, reducing track-to-track seeks. *FastTrax* also avoids placements that straddle bad or held clusters and rarely leaves any fragmented files.

Many of our customers buy *FastTrax* after purchasing a defragmenter that can't do the job. Your tests should have covered the many real-world cases where programs like *FastTrax* shine.

MARK ELFIELD
PRESIDENT
FASTTRAX INT'L

Mr. Elfield's point that the other optimizers reviewed can't defragment all size disks in all cases is well taken. In the interest of fairness, we should have noted explicitly that there is no limit to the size or type of disk that FastTrax *can defragment, though it may need expanded memory to defrag big drives that use small clusters. —Ed.*

Clarifications

The August *Consumer Watch* item "What to Do With Outdated Software" incompletely described the procedure for donating software to a nonprofit organization when you upgrade. According to Jodi Morrison, litigation coordinator for the Software Publishers Association, you must get the developer's permission before donating.

WordPerfect Corporation changed the name of the product we previewed in September from *DrawPerfect 2.0* to *WordPerfect Presentations 2.0*. Unfortunately we received the name change after the September issue went to press.

Mail your reactions, responses, and ideas to Letters, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Letters; CompuServe, 74055,412; MCI Mail, PC World Editorial; or 415/442-1891 (fax). Include your name, city, state, and phone number. We reserve the right to edit letters.*

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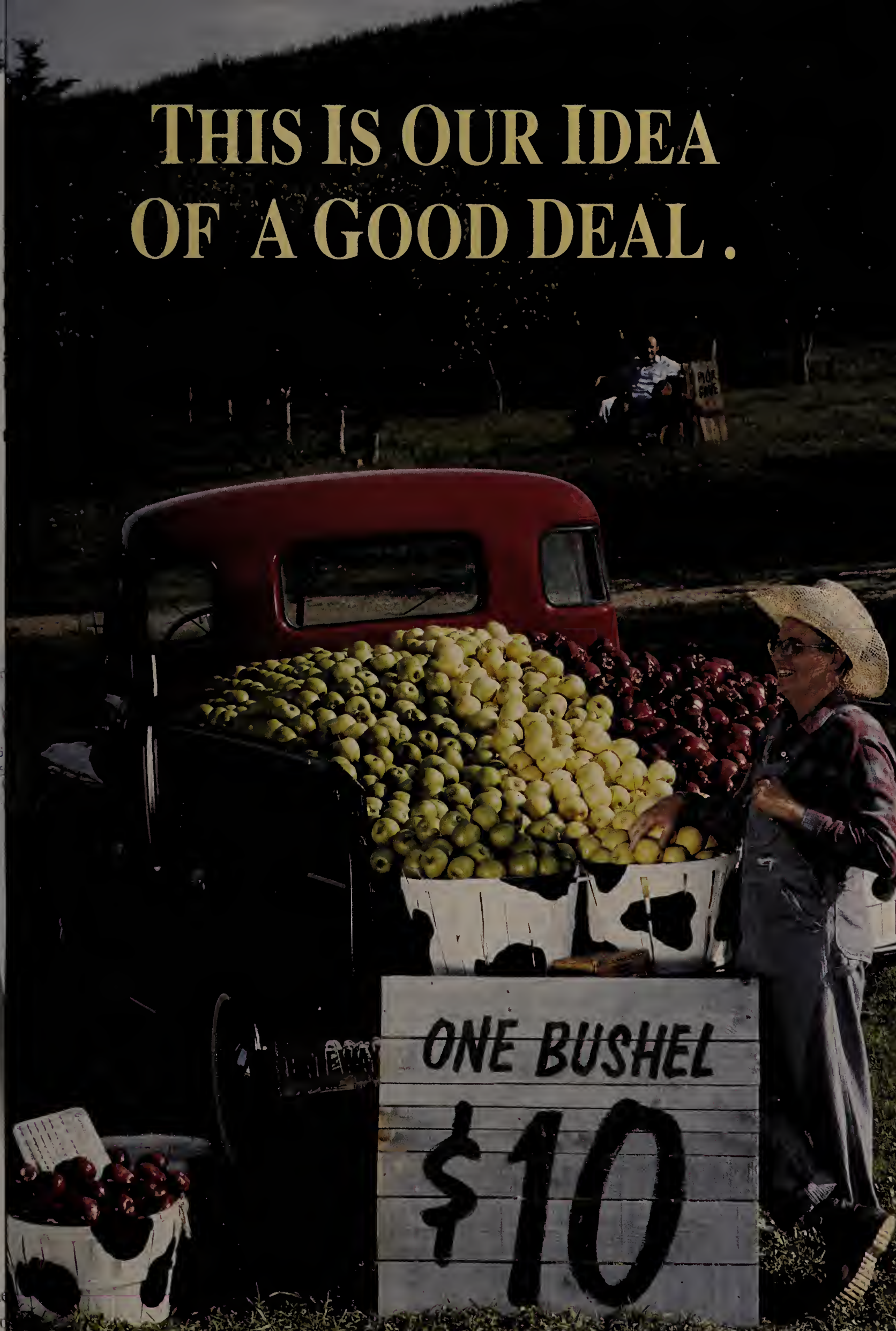

APPLES TO APPLES, YOU

With all the price paring going on in the industry, the PC crop looks luscious — but now, more than ever, it's important to compare apples to apples. You can look at two 486SX machines and actually be comparing an apple to an orange. What's inside makes a big difference. Other manufacturers do whatever it takes to hit a price point, and what you thought was a peach may turn out to be a lemon.

The trick is to weed through PC manufacturers to find the one that's perfected the recipe. You need the right ingredients mixed together in just the right way: the smartest system features, quality components, the company's strength and a reputation for the best, most knowledgeable service.

Peel away the hype and compare performance and features. Apples to apples, you'll find Gateway 2000 is the only company where a bushel is still a bushel. And a dollar buys more today than it did yesterday. That's value. That's the Gateway 2000 difference.

Recipe For A Full Course PC With All The Trimmings

Performance

CPUs
* Preset your PC for tomorrow's software by choosing a 486 system – i486 CPUs are designed for power-hungry applications.
* Check for memory cache for optimal processor and memory performance. 64k is your best choice.

Drives
* Avoid slow cooking — make sure your access time is less than 15ms.
* Blend in at least 32k of cache
* RIDE (Rapid Integrated Drive Electronics), Gateway's exclusive disk performance enhancement, will spice up your performance even more.

Video
* To serve up the best Windows performance, look for coprocessed video.
* VRAM vs DRAM: Don't settle for stale ingredients — VRAM is faster. Remember, add at least 1MB RAM.
* Add a local bus video for the best video performance, but avoid proprietary local buses.

Features

RAM
* For the best results, start out with a minimum of 4MB. We recommend 8MB.
* Make sure your machine is expandable to at least 16MB, but look for upgradeability to 64MB.

Drives
* Stir in a bare minimum of 80MB.
* Add both 5.25" and 3.5" floppies

Monitors
* Start out with a 14-inch, 1024 x 768 NI color monitor.
* Upgrade to a 15-inch color monitor with a flat, square, non-glare screen for a larger, brighter viewing area.

Software
* Your system should include Microsoft® DOS® 5.0 and MS Windows™ 3.1, installed and ready to run.
* Toss in your choice of free applications software options, preinstalled.

Keyboard
* Add a programmable keyboard with more than 101 keys. Mix in two sets of function keys.

Company
* With Gateway 2000, you get a financially-sound, proven company with one of the best balance sheets in the industry.
* Combine Midwestern work ethics and ingenuity with liberal amounts of buying power to bring you the latest technology at an unbeatable price

The "Orchard" people are all Gateway 2000 employees, photographed at P.B. Apple Orchard in Sioux City, Iowa.

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Nomad Notebooks

Our small, lightweight Nomad notebook PCs give you desktop performance no matter where you are.

PC Magazine reports, "Geared to low power consumption, Gateway 2000's Nomad line offers excellent battery life, light weight, quality performance, and a highly competitive price."

Computer Shopper added, "The Nomad is far and away the best laptop around for getting the maximum value out of a single battery charge."

"...(it's) clearly the best general-purpose choice (for a notebook computer)."

And our 486 Nomads don't sacrifice performance for portability. You get a bushel basket full of standard features!

The HandBook™

Sometimes a product is so special, it's impossible to compare it to anything else. And that's the way it is with our one-of-a-kind HandBook — a real PC in miniature form!

It weighs just 2.75 pounds and measures 6 x 9 inches. Yet it delivers 286-class performance and speedily runs all your favorite DOS applications with a bright backlit screen, a bonafide 40MB hard drive and a comfortable 78-key keyboard (no chiclet keys). And you get up to 4.5 hours battery life with power management.

Your HandBook arrives with MS-DOS® 5.0, LapLink® XL from Traveling Software, MS PC Works™, and Central Point® Desktop. A serial cable is included for downloading to your desktop.

An Extra Slice For Gateway Customers

Application software is ripe for the picking when you buy any Gateway 486 desktop or tower system. Choose one free option from the list on the back page of this ad.

The 15-Inch CrystalScan 1572FS

A flat, square, non-glare screen reduces distortion around the corners and provides edge-to-edge display – an upgrade option with the purchase of any Gateway 2000 desktop system for an additional **$195**.

The Gateway 2000 TelePath™ Fax/Modem

A 14,400 bps mode, V .32bis, with 9,600 bps fax capability. Includes WinFax Pro,™ Crosstalk for Windows,™ Qmodem™ and a free 30-day basic services CompuServe® membership - all for only **$195**!

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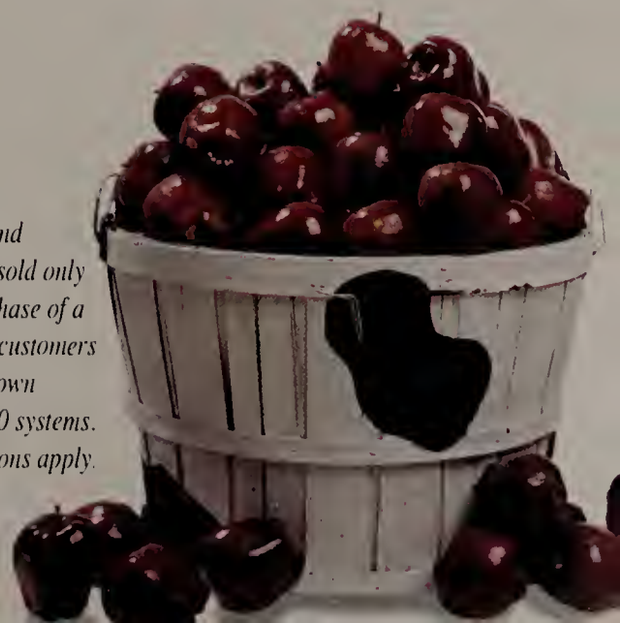
Components, peripherals and software are sold only with the purchase of a system, or to customers who already own Gateway 2000 systems. Some limitations apply.



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- FieldMouse Pointing Device
- MS DOS 5.0 and Windows 3.1
- MS Works™ for Windows

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NOMAD 425DXL

- 25MHz, Intel 486DXLP Processor
- 4MB RAM
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- Backlit 10" VGA Screen, 64 Grays
- Simultaneous Video with 1MB
- Size 8.5" x 11" x 1.8", 5.8 Lbs.
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25MHz 386SX

- Intel 386SX Processor
- 4MB RAM
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- Microsoft® Mouse
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- Microsoft Mouse
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- Intel 486DX Processor
- 64K Memory Cache
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- ATI Graphics Ultra with 1MB
- 14" CrystalScan 1024NI Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0 and Windows 3.1
- Choice of Application Software

$2295

50MHz 486DX2

- Intel 486DX2 Processor
- 64K Memory Cache
- 8MB RAM
- 1.2MB & 1.44MB Drives
- 200MB 13ms IDE** Cache Drive
- ATI Graphics Ultra with 1MB
- 14" CrystalScan 1024NI Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0 and Windows 3.1
- Choice of Application Software

$2595

66MHz 486DX2

- Intel 486DX2 Processor
- 64K Memory Cache
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- 1.2MB & 1.44MB Drives
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- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0 and Windows 3.1
- Choice of Application Software

$2995

66MHz 486DX2 EISA

- Intel 486DX2 Processor
- 128K Memory Cache
- 8MB RAM
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- 16-Bit SVGA with 1MB
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- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0 and Windows 3.1
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- Microsoft® Excel for Windows™ 4.0
- MS Word for Windows™ 2.0
- MS PowerPoint for Windows™ 3.0
- MS Project for Windows™ 3.0
- Borland Paradox® 4.0 and Turbo Pascal 1.5 or C++® 3.1
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- The Windows Programmer P[illegible] *(MS QuickC,™ Visual Bas[illegible])*
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CONSUMER WATCH

BY CHRISTINA WOOD AND RICHARD MELVILLE

Advice and information for the computer consumer

National Guide to User Groups

Do you often find yourself puzzled by your computer's behavior? Asking the dog why you can't print? Chatting to your butcher about fonts? Maybe you need to join a PC user group and get involved in an open exchange with like-minded enthusiasts.

To find a group close to home, check the following updated list of user groups in the United States. We regret we couldn't include the many user groups located elsewhere due to space limitations. We'd like to thank the Association of PC User Groups (APCUG), an umbrella organization for user groups; Fog International Computer Users; and Steve Bass of the Pasadena IBM Users Group for assistance in compiling this list.

We apologize to those groups not listed. We include only groups whose information we could verify with a member. If your group isn't listed, send us the details, and we'll include it next year.

Groups are listed alphabetically by state and city. If you don't find a group in your area listed here, contact one of the following organizations:

America Online
8619 Westwood Center Dr.
#200
Vienna, VA 22182
800/827-6364,
703/893-6288
(for on-line membership)

Association of PC User Groups, Inc.
914/876-6678
(user group locator service line)

ALABAMA

Birmingham IBM PC User Group
P.O. Box 19248
Birmingham, AL
35219-9248
205/871-1939
$20/yr.; NL; 8 SIGs; TS; TE; SL

Huntsville PC User Group
P.O. Box 16013
Huntsville, AL 35802
205/539-5940,
205/880-6872 (BBS)
$20/yr.; NL; 4 SIGs; TS; TE; SL; BBS

Montgomery PC Users Club
3505 McGehee Rd.
Montgomery, AL 36111
205/288-4434
$25/yr.; NL; 3 SIGs; TS; TE; BBS

ALASKA

Polar PC User Group
P.O. Box 72934
Fairbanks, AK 99707
907/452-2500
$10/yr.; NL; TE; SL

ARIZONA

Phoenix PC Users Group
P.O. Box 35637
Phoenix, AZ 85069-5637
602/222-8511 (24 hours),
602/222-5491 (BBS)
$40/yr.; NL; 12 SIGs; TS; TE; BBS

South Mountain Users Group
P.O. Box 50002
Phoenix, AZ 85076
602/893-7523
$30/yr.; NL; 5 SIGs; TS; TE; SL

Tucson Computer Society
P.O. Box 1489
Tucson, AZ 85702
602/742-3468,
602/744-2314 (BBS)
$24/yr.; NL; 15 SIGs; TS; TE; SL; BBS

ARKANSAS

Rogers PC Users Group
P.O. Box 1251
Bentonville, AR 72712
501/631-7158
NL; TS; TE

Arkansas/Oklahoma PC Users Group
P.O. Box 853
Fort Smith, AR 72902-0853
501/784-8406,
501/646-0543 (BBS)
$20/yr.; NL; 4 SIGs; TS; TE; SL; BBS

Central Arkansas PC Users Association
P.O. Box 24064
Little Rock, AR 72221
501/225-9304,
501/758-3120 (BBS)
$24/yr.; NL; SL; BBS

Twin Lakes Computer Users Group
Rt. 5 Box 127
Mountain Home, AR 72653
501/425-9061,
501/424-2665 (BBS)
$15/yr.; NL; 2 SIGs; TS; TE; SL; BBS

NW Arkansas Microcomputer User Group
Rt. 4, Box 376
Springdale, AR
72762-9307
501/361-2963
$15/yr.; NL; TS; TE; SL

Jonesboro User Group
P.O. Box 838
State University, AR 72467
501/935-6659,
501/932-6949 (BBS)
$12/yr.; NL; 6 SIGs; TS; TE; SL; BBS

CALIFORNIA

Kern Independent PC Users Group
P.O. Box 2780
Bakersfield, CA 93303
805/322-8800 (BBS)
$30/yr.; NL; TS; TE; SL; BBS

Berkeley PC/Compatibles User Group
1145 Walnut St.
Berkeley, CA 94707
510/526-4033
No fee; NL; 1 SIG; TS; TE; SL; BBS

The Valley Computer Club
P.O. Box 6008
Burbonk, CA 91510-6008
818/842-3707,
213/227-9684 (BBS)
$25/yr.; NL; 3 SIGs; TS; TE; SL; BBS

R&W IBM PC Users Group
2076 San Gabriel
Clovis, CA 93611
209/294-8831
No fee; NL; TS; TE; SL

Orange Coast IBM PC User Group (OCIPUG)
P.O. Box 6100-211
Costa Mesa, CA 92628
714/843-2048,
714/843-0388 (BBS)
$36/yr.; NL; 21 SIGs; TS; TE; SL; BBS

Color America, Inc.
1466 Spruce Tree Dr.
Diamond Bar, CA 91765
714/861-2949,
818/963-3537 (BBS)
$25/yr.; NL; 2 SIGs; TS; TE; SL; BBS

Fog International Computer Users
P.O. Box 1030
Dixon, CA 95620
916/678-7353 (days),
916/678-7355 (BBS)
$30/yr.; NL; TS; TE; SL; BBS

IBM Humboldt Users Group
P.O. Box 6721
Eureko, CA 95502
707/442-4621
$27 first yr., $12 thereafter; NL; 2 SIGs; TS; TE; SL

Fresno PC Users Group
P.O. Box 5987
Fresno, CA 93755
209/268-0944,
209/277-8368 (BBS)
$24/yr.; NL; 10 SIGs; TS; SL; BBS

Abbreviations Key
NL: newsletter
SIG: special interest group
TS: technicol support
TE: training ond education
SL: software library
BBS: bulletin board service

ANTHONY RUSSO

Goleta DeskTop Publishing User's Group
P.O. Box 2450
Goleta, CA 93118-2450
805/685-7937
$15/yr.; NL; TS; TE; SL; BBS

Microlink
15865-B Gale Ave. #1005
Hacienda Hts., CA 91745
714/354-7722,
818/968-0389 (BBS)
$25/yr.; NL; 6 SIGs; TS; TE; SL; BBS

Antelope Valley Microcomputer User Group
P.O. Box 2942
Lancaster, CA 93539
805/948-5166,
805/948-1940 (BBS)
$20/yr,. $10 initiatian fee; NL; TS; TE; SL; BBS

UCLA PC Users Group
P.O. Box 661189
Las Angeles, CA 90066
310/473-6668
$36/yr.; NL; 25 SIGs; TS; TE; SL; BBS

USC Microcomputer User Group
Cammans Bldg. #5
830 Childs Way
Las Angeles, CA 90007
213/740-1727
NL; 3 SIGs; TS; TE; SL; BBS

San Luis Obispo PC Users Group
2100 Andre Ave.
Las Osas, CA 93402
805/528-0121,
805/528-3753 (BBS)
$20/yr.; NL; 2 SIGs; TS; TE; SL; BBS

SLO Bytes PCUG
1472 Sixth St.
Las Osas, CA 93402
805/528-1759,
805/528-6074 (BBS)
$20/yr.; NL; TS; TE; SL; BBS

Modesto PC Users Group
P.O. Box 5122
Madesta, CA 95352-5122
209/529-9612
NL; 10 SIGs; TS; TE; SL; BBS

Abbreviations Key
NL: newsletter
SIG: special interest graup
TS: technical suppart
TE: training and educatian
SL: saftware library
BBS: bulletin baard service

Monterey Bay Users' Group—PC
177 Webster St. #A354
Manterey, CA 93940
408/373-3773 (Cricket BBS)
NL ($25); 15 SIGs; TS; SL; BBS

Napa Valley PC Users Group
P.O. Box 2653
Napa, CA 94558-0265
707/257-2675,
707/257-2338 (BBS)
$15/yr.; NL; TS; TE; SL; BBS

North Orange County Computer Club
P.O. Box 3616
Orange, CA 92665
714/730-6749,
714/730-6743 (BBS)
$25/yr.; NL; 28 SIGs; TS; TE; SL; BBS

Channel Islands PC Users' Group
P.O. Box 5025
Oxnard, CA 93031
805/983-4741
(9 a.m.–9 p.m.)
805/985-1657 (BBS)
$20/yr.; NL; 2 SIGs; TS; TE; SL; BBS

Pasadena IBM Users Group
711 E. Walnut St. #306
Pasadena, CA 91101
818/795-2300 (days),
818/332-6580 (BBS)
$48/yr.; NL; 10 SIGs; TS; TE; SL; BBS

Riverside IBM Computer Club
7860 Live Oak Dr.
Riverside, CA 92509-5339
714/685-5407,
714/352-2825 (BBS)
$25/yr.; NL; TS; TE; SL; BBS

Sacramento PC Users Group
P.O. Box 162227
Sacramenta, CA
95816-2227
916/386-9865,
916/338-6434,
916/395-3153 (BBS)
$25/yr.; NL; 25 SIGs; TS; TE; SL; BBS

Inland Empire Computer Group
P.O. Box 5281
San Bernardina, CA
92412-5281
714/864-3093,
714/825-4042 (BBS)
$20/yr.; NL; SL; BBS

The IBM & Compatibles User Group
P.O. Box 87770
San Diega, CA
92138-7770
619/549-3787 (recarded message)
$25 fee for parent graup, San Diega Camputer Saciety; NL ($25); TS; TE; SL

San Diego Computer Society
P.O. Box 81444
San Diega, CA
92138-7770
619/549-3787,
619/549-9137 (BBS),
619/549-9142 (BBS)
$25/yr. with NL, $12.50/yr. withaut; 20 SIGs; TS; TE; SL; BBS

PC Clone User Group
2440 16th St. #301
San Francisca, CA 94103
415/861-9321
$25/yr.; NL; TS; TE

San Francisco Business Computers
10 Rena Pl. #2
San Francisca, CA 94133
415/788-5338
$48/yr.; NL; TS; TE

San Francisco Computer Society
P.O. Box 421233
101 Hyde St.
San Francisca, CA 94142
415/221-9156
$30/yr.; NL; 2 SIGs; TS; TE; SL

San Francisco PC Users Group
3145 Geary Blvd. #155
San Francisca, CA
94118-3316
415/979-5879,
415/621-2609 (BBS)
$40/yr.; NL; 18 SIGs; TS; TE; SL; BBS

Santa Barbara PC Users Group
281 Oak Rd.
Santa Barbara, CA 93108
805/969-9961,
805/682-6158 (BBS)
$20/yr.; NL; 4 SIGs; TS; TE; SL; BBS

Silicon Valley Computer Society
2464 El Camina Real #190
Santa Clara, CA 95051
408/286-1271,
408/262-5150 (BBS)
$30/yr.; NL; 22 SIGs; TS; TE; SL; BBS

PC Users' Group of the Redwoods
P.O. Box 5055
Santa Rasa, CA 95402
707/546-8329 (recarded message),
707/579-8334 (BBS)
$30/yr.; NL; TS; TE; SL; BBS

Greater South Bay PC Users Group (GSBUG)
P.O. Box 6950
Tarrance, CA 90504-0050
310/329-2804,
310/516-0834 (BBS)
$25/yr.; NL; 11 SIGs; TS; TE; SL; BBS

North Bay Users Group
315 Nevada St.
Valleja, CA 94590
707/644-9327,
707/643-6284 (BBS)
$20 first yr., $17 thereafter; NL; 5 SIGs; TS; TE; SL; BBS

COLORADO

Mile High Computer Resource Organization
8175A Sheridan Blvd.
#201
Arvada, CO 80003
303/286-7455,
303/752-2943 (BBS)
$25 first yr., $20 thereafter, $12/yr. students; NL; 8 SIGs; TS; TE; SL; BBS

Colorado Springs PC Users Group
P.O. Box 1028
Calarada Springs, CO
80901
719/596-6938,
719/632-2566 (BBS)
$30/yr.; NL; 7 SIGs; TS; TE; SL; BBS

Windows on the Rockies User Group
P.O. Box 9929
Denver, CO 80209-0929
303/733-1277
$30/yr., $60/yr. carparate; NL; 1 SIG; TS; TE; SL; BBS

Front Range PC Users Group
305 W. Magnalia #152
Fart Callins, CO 80521
303/223-8654,
303/484-0564 (BBS)
$25/yr.; NL; 6 SIGs; TS; TE; SL; BBS

Chaffee County Computer Club
P.O. Box 7
Pancha Springs, CO 81242
719/539-3739
$18/yr.; NL; TS; SL

CONNECTICUT

Central CT PC (PCjr) Group
781 Main St.
Caventry, CT 06238
203/742-6083
$6/yr.; NL; 1 SIG; TS; TE; SL

Connecticut IBM PC Users' Group
P.O. Box 291
New Canaan, CT
06840-0291
203/762-0229,
203/972-0234 (BBS)
$25/yr.; NL; 6 SIGs; TS; SL; BBS

The PC Users Group of Connecticut
P.O. Box 545
Trumbull, CT 06611
203/334-4267,
203/452-9442 (BBS)
$20/yr.; NL; 4 SIGs; TS; TE; SL; BBS

Business & Professional Micro Users Group (BP/MUG)
P.O. Box 271468
West Hartford, CT
06127-1468
203/242-6587
$15/yr.; NL; 5 SIGs; TS; TE; SL

DISTRICT OF COLUMBIA

Association of PC User Groups, Inc.
(user graup arganizatian)
1730 M St. NW #700
Washingtan, DC 20036
803/244-6246,
408/439-9367 (BBS)
$25/yr.; NL; TS; TE; SL; BBS

FLORIDA

Polk IBM-PC User Group
2182 Lake Ariana Blvd.
Auburndale, FL
33823-2549
813/967-5746,
813/967-0936 (BBS)
$20/yr., $25/yr. family, $50/yr. carparate; NL; 9 SIGs; TS; TE; SL; BBS

"Our supervising engineers are demanding, hard to please and pressed for time," explains Mark Richardson, PC coordinator for the Medium Engine Division of Caterpillar, Inc.

Keeping their design projects running smoothly meant finding a drawing program that offered unlimited functionality while also being easy to use.

That's why Mark chose Micrografx Designer.™

Designer's advanced power and accuracy allow quick, precise drawing of fuel injectors, turbo chargers and transmissions, without taking on a cumbersome CAD program.

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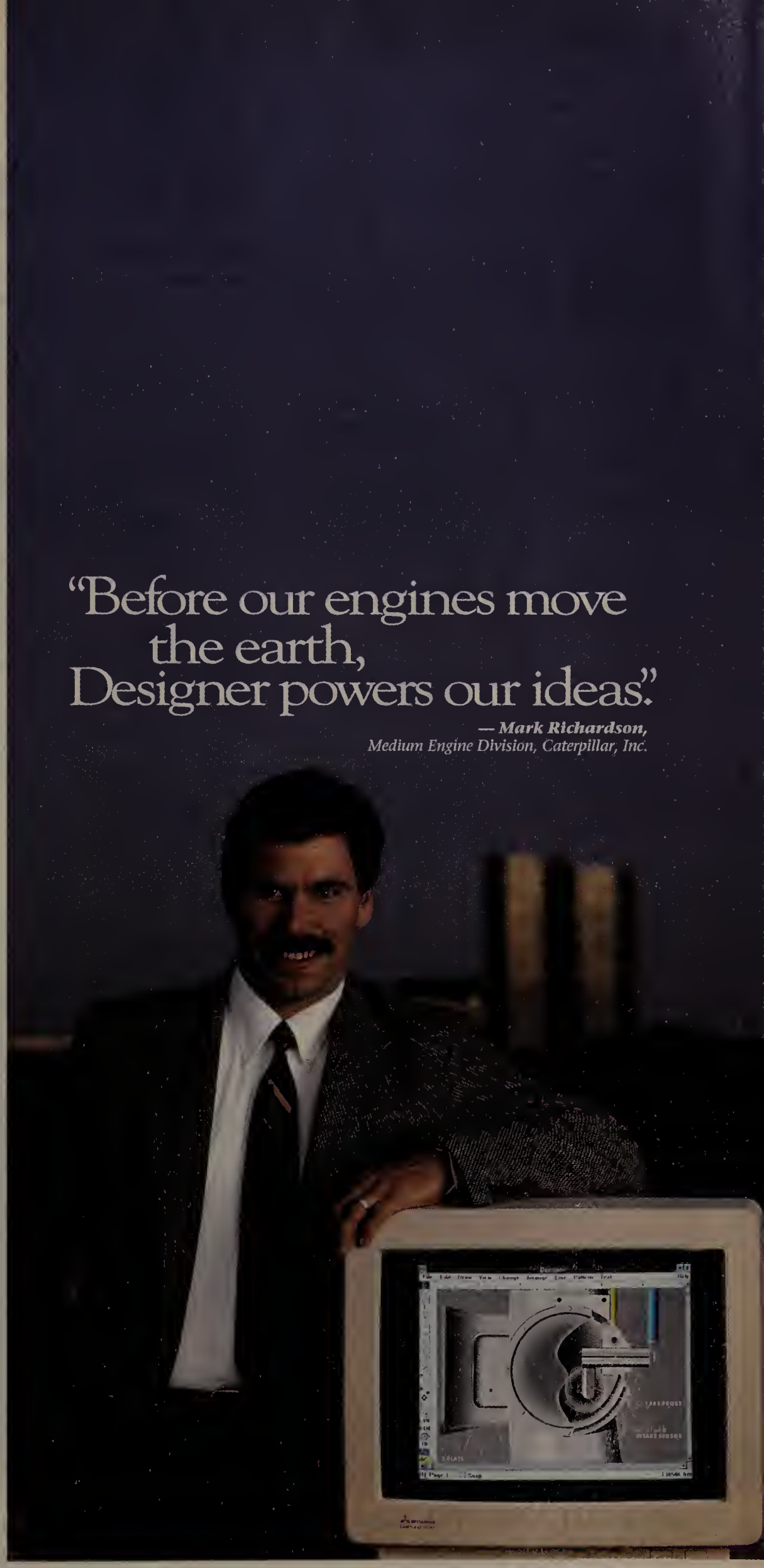

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Boca Raton Computer Society, Inc.
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33427-3421
407/498-8557,
407/391-4884 (BBS)
$20/yr.; NL; 6 SIGs; TS; TE; SL; BBS

Manatee PC Users Group
411 67th St. NW
Brodenton, FL 34209-1652
813/792-3437,
813/795-0063 (recorded messoge),
813/798-3126 (BBS)
$20/yr.; NL; 24 SIGs; TS; TE; SL; BBS

Tampa Bay Netware User's Group
P.O. Box 7702
Cleorwoter, FL
34618-7702
813/443-6738,
813/531-5428 (BBS)
$20/yr.; NL; TS; TE; SL; BBS

Southwest Florida PC Users Group
P.O. Box 1466
Fort Myers, FL 33902
813/997-0990
$25/yr.; NL; 3 SIGs; TS; TE; SL

South Polk County PC Users Group
815 N. Loke Reedy Blvd.
Frostproof, FL 33843
813/635-3381
No fee; TE

The HogTown Hackers
4623 N.W. 13th Ave.
Goinesville, FL 32605
904/392-3151 (doys),
904/378-9700 (evenings),
904/375-8846 (BBS)
$15/yr.; NL; TS; TE; SL; BBS

IBM PC Medical Users Group
Deportment of Anesthesiology
P.O. Box 100254
Goinesville, FL 32610
904/392-3151
No fee; NL; TS; TE; SL

Miami PC User Group
4651 Sheridon St. #300
Hollywood, FL 33021
305/962-8889,
305/948-6332,
305/680-9481 (BBS)
$24/yr.; NL; 6 SIGs; TS; TE; SL; BBS

PC Users Group of Jacksonville
P.O. Box 47197
Jocksonville, FL
32247-7197
904/737-6327,
904/249-8368 (BBS)
$25/yr.; NL; 10 SIGs; TS; TE; SL; BBS

Ridge Area Computer Club
251 Tower Lokes
Loke Woles, FL 33853
813/676-5936
$20/yr.; NL; 4 SIGs; TS; TE; SL

Central Florida Computer Society
P.O. Box 948019
Moitlond, FL 32751
407/332-2883
$20/yr.; NL; 12 SIGs; TS; TE; SL; BBS

PC—Business Users Group (PC—B.U.G.)
P.O. Box 285
Noples, FL 33939
813/261-8208
$10/yr.; NL; 2 SIGs; TS; TE; SL

Charlotte County PC Users Group
P.O. Box 3530
Port Chorlotte, FL 33949
813/627-5231,
813/637-9303 (BBS)
$25/yr.; NL; 5 SIGs; TS; TE; SL; BBS

Tri-County Computer User Group, Inc.
P.O. Box 7414
Port St. Lucie, FL
34985-7414
407/878-5688,
407/871-1550 (BBS)
$25/yr.; NL; 6 SIGs; TS; TE; SL; BBS

EpSuncoast Users Group
1237 79th St. S
St. Petersburg, FL 33707
813/343-2668 (doys)
$15/yr.; NL; 2 SIGs; TS; TE; SL

Pinellas IBM PC User Group
5100 Dover St. NE
St. Petersburg, FL 33703
813/443-4433,
813/733-8693 (BBS)
$25/yr.; NL; 12 SIGs; TS; TE; SL; BBS

Sarasota IBM-PC User's Group, Inc.
4557 Comino Reol
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32937-2111
407/259-1389
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Tampa, FL 33601-3492
813/932-6745
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Univ. of South Florida PC Users Group
University of South Florida
SVC 4010
c/o U.C.S. Infocenter
Tampa, FL 33620-6940
813/974-2770
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Palm Beach PC Users Group
319 Sequoia Dr.
West Palm Beach, FL 33409
407/689-8841
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407/775-1338 (BBS)
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404/879-5985 (BBS)
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708/462-7560 (BBS),
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708/824-2617,
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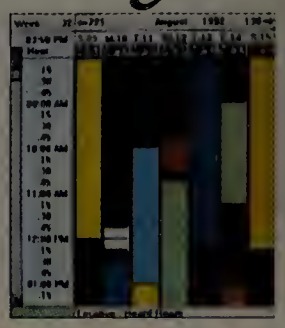

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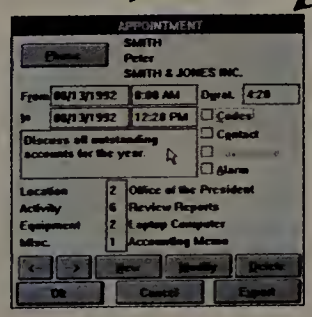

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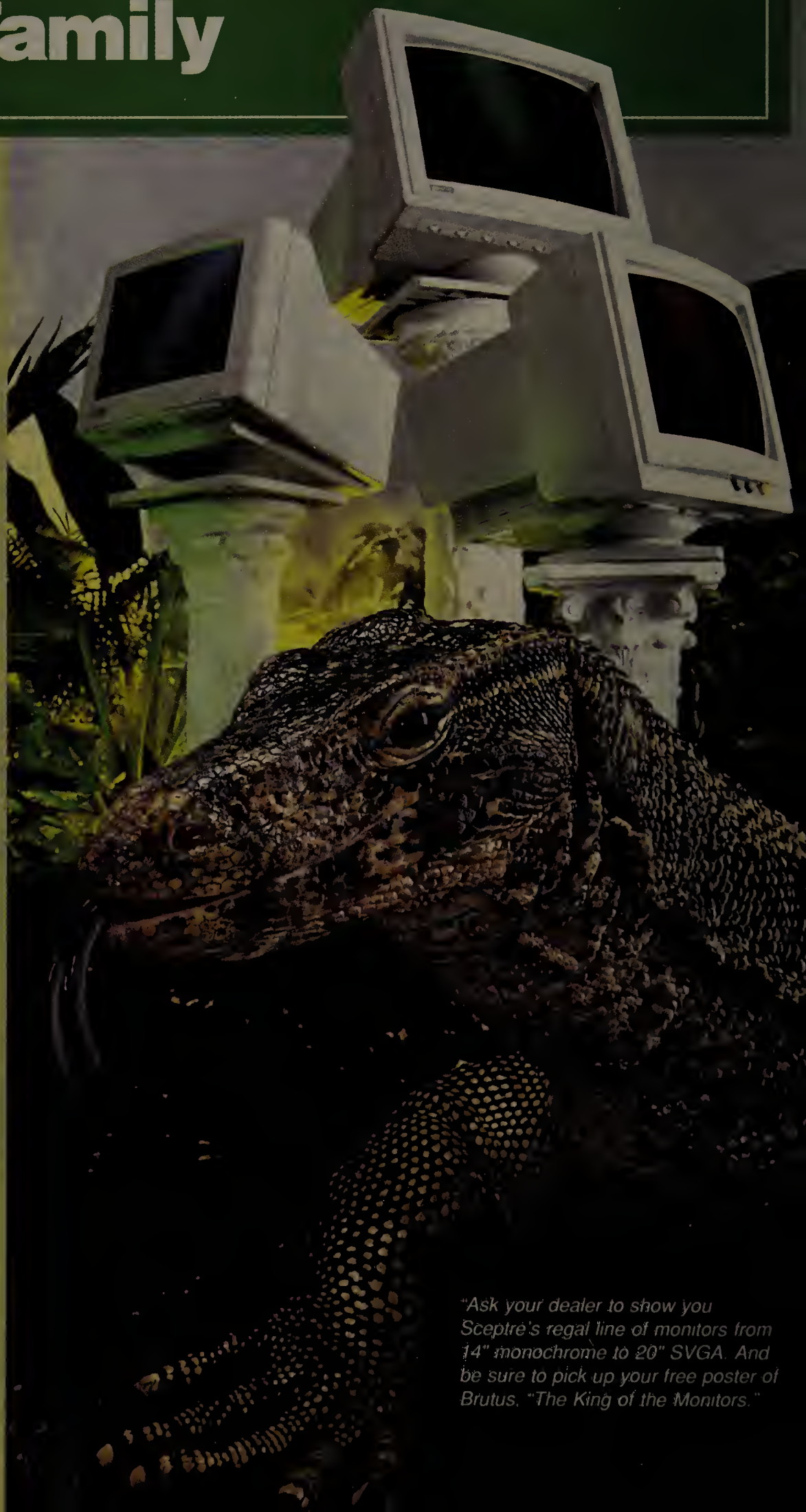

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P.O. Box 6440
Pittsburgh, PA 15212
412/766-8790,
412/881-1749 (BBS)
$20/yr.; NL; 5 SIGs; TS; TE; SL; BBS

Professional PC Users Group of Pittsburgh
P.O. Box 23116
4th Ave. Stotion
Pittsburgh, PA 15222
412/655-1242 (BBS)
NL; 8 SIGs; TS; TE; SL; BBS

Exton PC Council, Inc. (EPIC)
310 N. High St.
West Chester, PA 19380
215/363-6912,
215/296-9496
$15/yr.; NL; 9 SIGs; TS; TE; SL

RHODE ISLAND

Providence Satellite, Boston Computer Society
4 Teokwood Ln.
Borrington, RI 02806-3217
401/245-5097
$39 fee for porent group, the Boston Computer Society; NL; 3 SIGs; TS; TE; SL

South County Computer Users Group
c/o Chuck Jacques
P.O. Box 493
Wakefield, RI 02880
401/783-6469,
401/783-7559 (BBS)
TS; TE; SL; BBS

SOUTH CAROLINA

Palmetto Personal Computer Club, Inc.
P.O. Box 2046
Columbia, SC 29202
803/776-2076,
803/776-9600 (BBS)
$25/yr., $50/yr. corporate; NL; 9 SIGs; TS; TE; SL; BBS

Upstate IBM-PC Users Group
P.O. Box 5521
Greenville, SC 29606
803/297-0289
$25 first yr., $15 thereafter; NL; 7 SIGs; TS; TE; SL; BBS

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Sioux Falls IBM and PC Compatibles Users Group
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Sioux Falls, SD 57105
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TENNESSEE

Cumberland Microcomputer Users Group
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615/526-4869,
615/526-3347 (BBS)
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Memphis PC Users Group
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Memphis, TN 38124-1756
901/375-4316,
901/368-1764 (BBS)
$25 first yr., $20 thereafter; NL; 12 SIGs; TS; TE; SL; BBS

Music City PC Users Group
488 Saddle Dr.
Nashville, TN 37221
615/662-0322,
615/662-0632 (BBS)
$35/yr., $45/yr. family, $250/yr. carporate; NL; 12 SIGs; TS; TE; BBS

Nashville Clippers Developers Association
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Nashville, TN 37221
615/662-0322,
615/662-0632 (BBS)
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East Tennessee PC Users Group
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Oak Ridge, TN 37830
615/690-8009
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TEXAS

Golden Triangle PC Club
5770 Clint Ln.
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409/880-8193,
409/899-1249 (BBS)
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Microcomputer Study Group, Dallas Section
Society of Petroleum Engineers
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Dallas, TX 75243-6108
214/349-7988,
214/349-3176
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North Texas PC Users Group, Inc.
P.O. Box 780066
Dallas, TX 75378-0066
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Houston, TX 77056
713/623-4425,
713/286-3200 (BBS)
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Mid-Cities PC User Group
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Hurst, TX 76054
817/571-9000,
817/577-2945 (BBS)
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Dallas–Fort Worth Users Group
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Irving, TX 75061
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Longview Computer Users Group
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903/759-4036,
903/236-7434 (BBS)
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North Dallas PC Users Group
735 Scottsdale Dr.
Richardson, TX 75080
214/690-8092
No fee; TS; TE

Alamo PC Organization, Inc.
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San Antonio, TX 78265-5180
512/655-1058,
512/434-1557 (BBS)
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Tyler Computer Club
4928 Richmond Rd.
Tyler, TX 75703
903/561-6136
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UTAH

Utah Blue Chips
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Abbreviations Key

NL: newsletter
SIG: special interest group
TS: technical support
TE: training and education
SL: software library
BBS: bulletin board service

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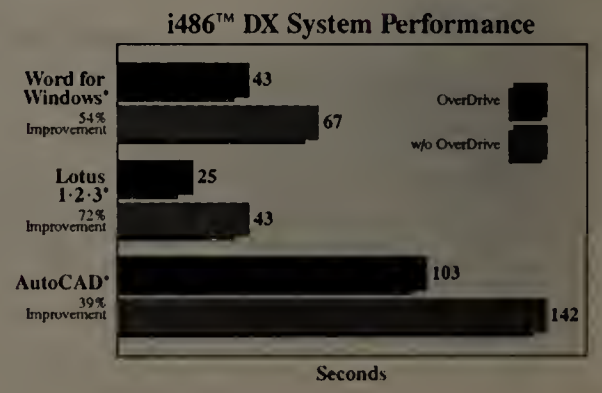

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414/735-2513 (BBS)
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La Crosse PC Users' Group
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La Crosse, WI 54602
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Madison PC User's Group
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Madison, WI 53701-2598
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608/233-0286 (BBS)
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Milwaukee, WI 53214
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Johnson Controls IBM PC Users Group
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Milwaukee, WI 53202
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No fee; SL

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Abbreviations Key

NL: newsletter
SIG: special interest group
TS: technical support
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Rex Farrance
Assistant Editor

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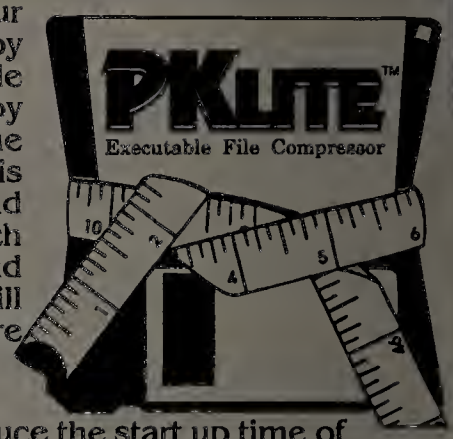

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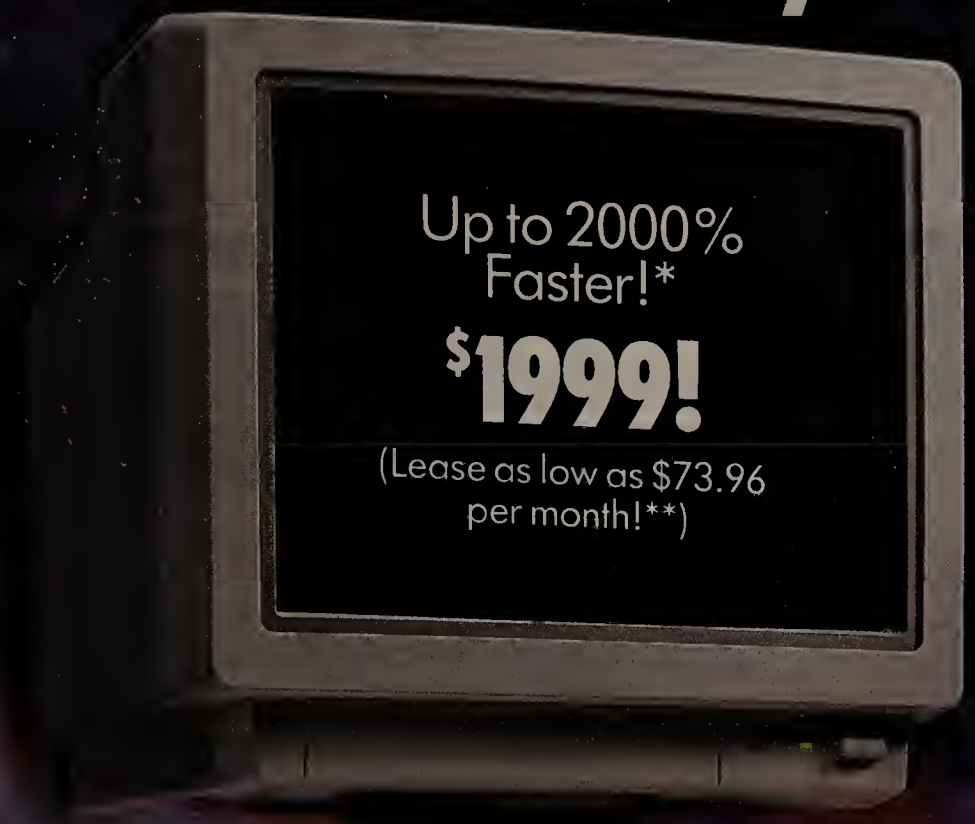

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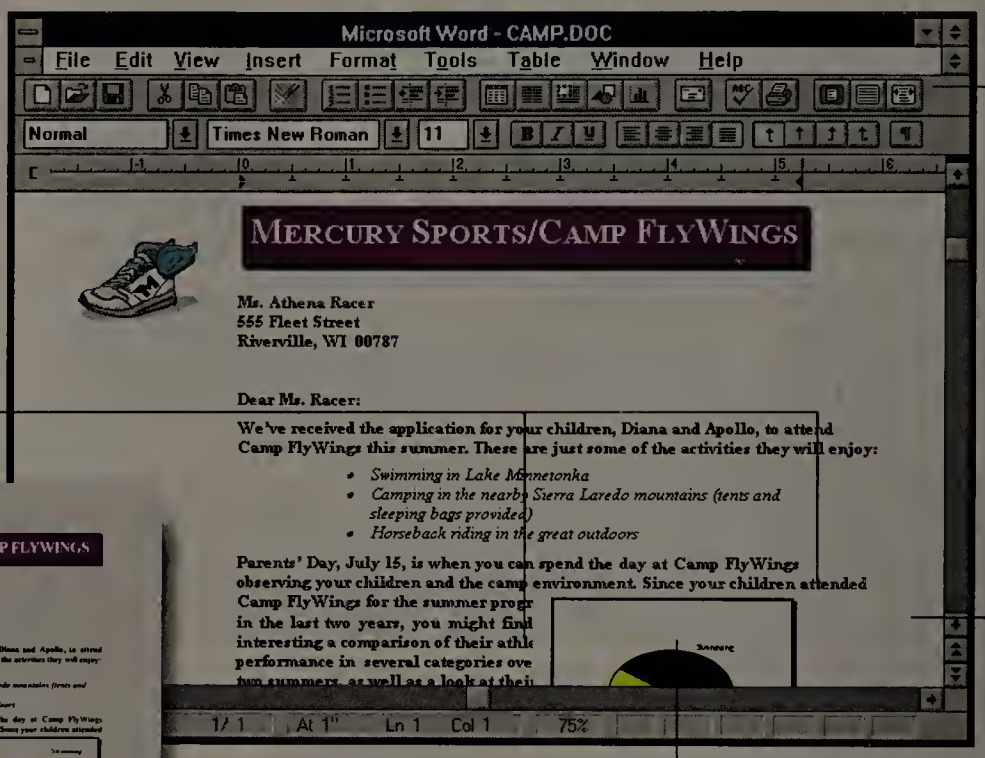
CODE N4609

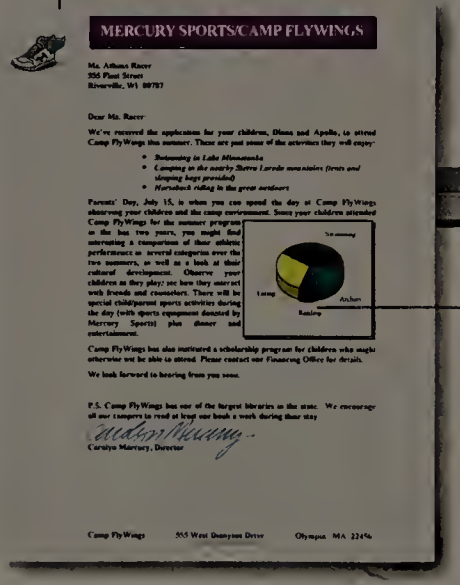
Their Word.

Microsoft Word 2.0

1

Don't take their word for it. Compare what you see on screen with what you get when you print. Notice, on screen, how some words are cut off and how the text runs beyond the margins. Now is that what you call WYSIWYG?





2

Want to circle a word in text or annotate your charts and graphs for added emphasis? Don't even try it in Word – because you can't.

3

What good are tools if they're inflexible? The Toolbar™ in Word sits on the top of your screen—on or off—those are your only options. And though you can change icons, you can't save sets of the ones you use most. And you certainly can't create your own icons.

4

Word has a Drag-and-Drop text editing feature. But that's about as far as it goes.

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Order your FREE Working Model, a trial version of our award-winning Ami Pro word processor for Windows. Judge for yourself that Ami Pro 3.0 is the easiest to learn, easiest to use word processor available. Just complete and mail this card or call 1-800-872-3387, ext. 6964. Offer expires 3/31/93.

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My disk format is: ☐ 3½" ☐ 5¼"

Do you currently own a word processor? ☐ Yes ☐ No

If yes, which one? ☐ Ami Pro ☐ MS Word ☐ WordPerfect ☐ Other

Approximately how many PC's are currently installed at your site? ☐ 1–4 ☐ 5+

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Against Ours.

Lotus Ami Pro 3.0

3

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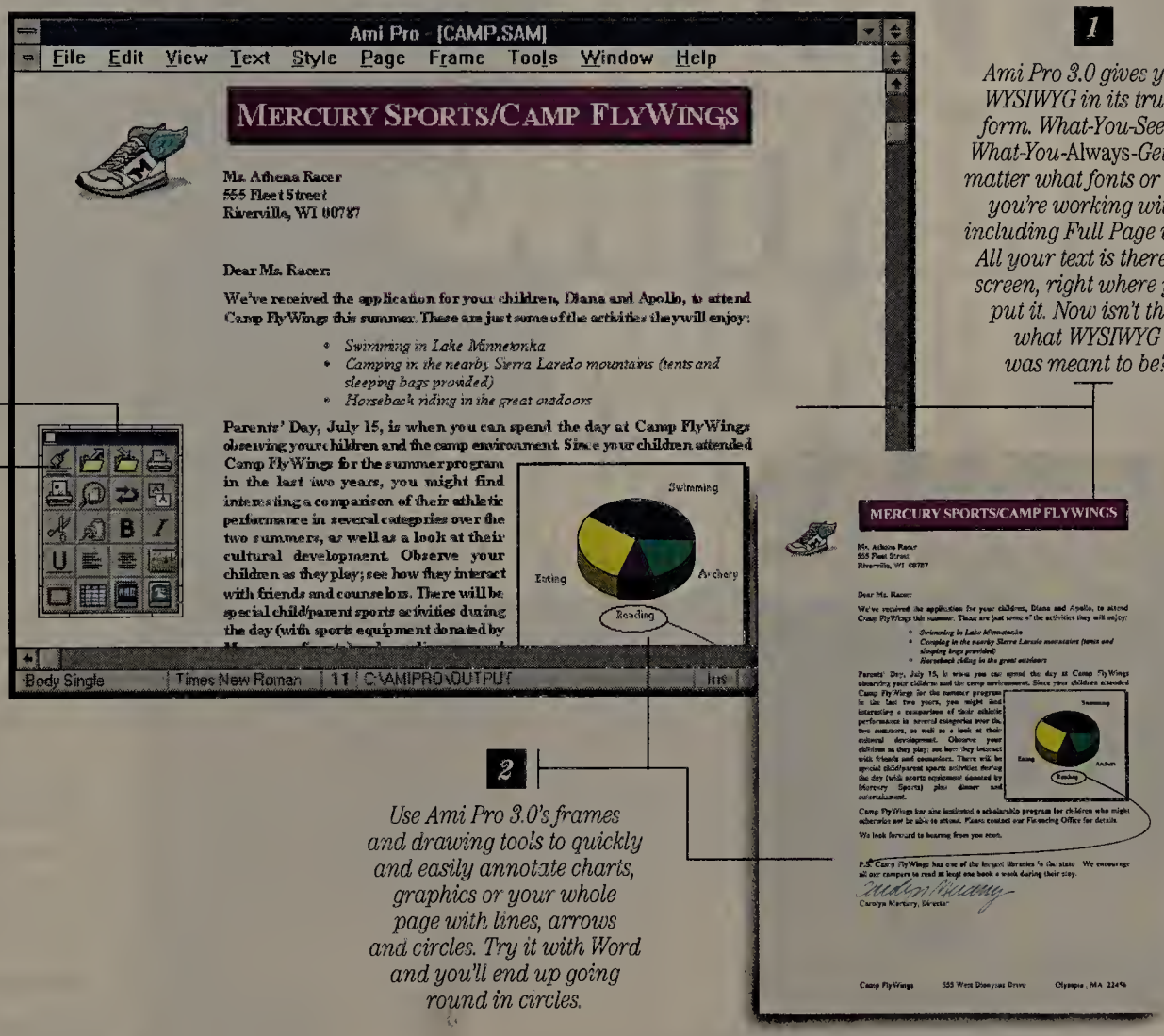
4

Of course, Ami Pro 3.0 has Drag-and-Drop, too. But that's not all. Ami Pro 3.0 is the only word processor with Fast Format. So you can take the formatted attributes of a highlighted block of text and, with one quick click, apply those attributes to other text blocks.



1

*Ami Pro 3.0 gives you WYSIWYG in its truest form. What-You-See-Is-What-You-*Always*-Get, no matter what fonts or view you're working with, including Full Page view. All your text is there on screen, right where you put it. Now isn't that what WYSIWYG was meant to be?*

2

Use Ami Pro 3.0's frames and drawing tools to quickly and easily annotate charts, graphics or your whole page with lines, arrows and circles. Try it with Word and you'll end up going round in circles.

There's no question about it. The new Lotus Ami Pro™ 3.0, the only word processor designed exclusively for Windows,™ is not only technically superior to Microsoft® Word. It's also much easier to learn and use.

Now if this comes as a surprise to you, or if you haven't yet considered Ami Pro, then you need to try it for yourself. Because once you do, you'll understand why *PC/Computing* (8/92) wrote that "Ami Pro 3.0 answers all the formidable challenges that Word for Windows 2.0 laid down and presents some new challenges for Microsoft to wrestle with."

Ami Pro 3.0 includes all the unique capabilities you see above. As well as a host of other easy-to-use features such as: a Style Sheet Viewer that lets you preview Style Sheets before selecting; SmartMerge™ that literally walks you through the different steps of completing a mail merge; a Clean Screen feature that lets you view only the tools you want to see on-screen to maximize workspace; a unique Context-sensitive Help system that's attached to each dialog box; and a QuickStart tutorial that gets you going in no time.

So don't take their word for it. Or even ours. You be the judge. If you're comparing word processors, order your free working model of Ami Pro 3.0 today by calling **1-800-872-3387, ext. 6964.** Or better still, upgrade from your current word processor* for just $129 and enjoy our new, free 24 hour support along with a 60-day money back guarantee.

Lotus Ami Pro 3.0 Word Processor for Windows

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WHAT ? NEXT

By MIKE HOGAN

Fax-Modem: Trojan Horse of Communications

MICHAEL LLEWELLYN

One of these days, you'll be between planes at an airport, and you'll call your PC-based answering machine using a Hewlett-Packard 95LX–like palmtop outfitted with a cellular fax-modem card. You'll tell your digital answering machine's software not only to play back your voice mail but to read you your faxes and E-mail. Then you'll call up an *Excel* budget, dictate changes, and embed a voice note explaining the changed cells. You'll attach it to a dictated E-mail embedded with CD-quality background music to soothe your savage boss, who will pick it up while vacationing in the Bahamas.

It will be at least a year before many key components for this scenario arrive, and longer before this level of performance can be shoehorned into subnotebook PCs. But the spadework begins on your desktop PC this fall with the introduction of vastly more capable fax-modem boards and software.

The happy symbiosis of exploding sales and free-falling prices is making fax-modems pervasive. Sales will triple this year, outstripping those of fax machines for the first time, says BIS Strategic Decisions. Cheap, standardized hardware is being bundled with increasingly capable fax-communications software like Smith Micro's *Quick Link II* and Delrina's *WinFax* to make ready-to-go solutions for under $200. In many cases, it's a no-lose proposition. For $59, you can get The Complete PC's Complete Modem with a 9600-bps fax, 2400-bps data modem, and fax-comm software in one neat bundle.

But spend all of $139, and the new Zoom Telphonics FCV+ Fax Modem will let you painlessly receive fax, data, and voice calls on a single phone line by taking advantage of Ma Bell's Distinctive Ring service, available in about two dozen states. The FCV+ and several other competitors let you simply assign different phone numbers to fax, data, and voice calls.

The FCV+ also has a jack for your answering machine, but digital answering machines are the way the world is headed. Prometheus's new $200 Home Office gives you the usual 9600/2400-bps fax-modem and lets you play back, record, and even forward both voice and fax messages while at home or away using any telephone handset. Its *Windows*-based *MaxFax* software's VCR-like control panel makes it easy to record messages as wave sounds for attachment to OLE-compatible applications.

In fact, despite many hardware improvements to come, *Windows* software will make the greatest difference to users. The Complete PC's $149 *RapidFax* is one of a new breed of software built to work with any fax-modem, combining comm and fax functions and facilitating faxing in the background, at a preset time, or from a remote phone. Powerful new versions of OCR programs like Calera's popular *FaxGrabber* or Caere's *FaxMaster* will answer the nagging what-do-I-do-with-my-bit-map question, while saving considerable disk space.

The current generation of application-specific chip sets are due to be replaced by general-purpose digital signal processors. Since your fax is busy only a fraction of the time, your fax-modem's brain could become the data pump for a variety of so-called soft hardware solutions—OCR, voice command, voice recognition, and text-to-speech. Compression and other standards issues need to be resolved, but this is a good way (although not the only one) for these nascent applications to land on your desktop without costing a fortune or a PC slot.

As the installed base grows, it draws vendors with slimmer gross margins and better ideas to drive down prices and drive up the state of the art faster. A cheap fax-modem today is the first step toward much broader communications horizons tomorrow. Anyway, who can get along without one?

WHAT TO WATCH

Business audio gets really real in September with the introduction of **Microsoft's Windows Sound System.** For a little under $300, this add-in board-software combination lets you record sound and annotate OLE-compatible applications, give your *Windows* applications voice commands, and have the *Windows* Sound System read back to you, say, the numbers in a *Windows* spreadsheet .... The active-matrix color price premium is $2000, but Toshiba's new $3199 **T1850C** gives you **passive-matrix color** for only $1000 over monochrome models .... HSC's new object-oriented **InterActive** lets you quickly paste together killer sales presentations that mix text charts, voice-over, music, and animation for around $350 .... Contact me at 310/312-8041 or MCI Mail, 329-2648.

End PC Envy

A Window on the Network

As you can see, DOS programs run alongside Microsoft Windows programs. You've seen this all before in our DESQview, right? Yes, but now there's more. DESQview/X lets you access and control a wide variety of PCs and workstations through your own PC. This feature is called remote computing.

In the example to the right, Lotus 1-2-3 is running in its own 386SX PC. The window at the top of the screen is a DOS window running on a remote 486 PC under DESQview/X. At the lower left is a FrameMaker program running on a remote IBM RS/ 6000 workstation in another part of the company.

Brand and Platform Freedom

DESQview/X runs on 386SX PCs and above. And from within windows on those PCs, you can use programs* running on any number of remote DESQview/X PCs if your network supports NetWare or NetBIOS. Add DESQview/X's optional Network Manager for TCP/IP networks and you can also access programs running on IBM RS/6000s to HP 9000s to Sun workstations. And it works the other way, too: these workstations can view and use DOS programs in their displays.

* DOS graphics programs currently run only on your local PC.

Works the Way You Want

You can change menus, add sub-menus. Add menu items that run remote programs. Change commands. DESQview/X gives you a menu to use for your macros. And if you prefer a graphical desk top instead of a menu, DESQview/X's Application Manager gives you buttons for opening a set of programs used in a project or even for launching remote programs. What's more, you can specify window size and color. And if you are using DOS text programs, you can set them up so that the font changes size as you change the size of the window. We call this feature scalable DOS windows (see the Lotus 1-2-3 window at left).

Looks the Way Users Want

DESQview/X supports sculptured menus, customizable backgrounds, graphic buttons for launching programs, icons and online context-sensitive help to make computing easy and fun. If you are a DESQview user, you'll find DESQview/X very familiar, with an improved look. But if you prefer a different look and feel, we offer two other interface options: OSF/Motif and OPEN LOOK.

Introducing DESQview/X™ for DOS

DESQview/X gives everyone access to the power of the fastest PC—or workstation—on the network.

Remote Computing is a Reality

Set up and run programs on remote DESQview/X PCs on your network. Instruct and support users. Diagnose problems and solve them from your own PC. DESQview/X provides controlled access to every program on every PC.

Here's How You Might Use DESQview/X on Your Network:

Say for instance your company uses a particular database that requires lots of horsepower or lots of memory to run. You can set it up on a 486 PC loaded with memory — then allow appropriate users access as you normally do on the network. The difference is that the database will be running on the remote 486 instead of the local PC. Users can take advantage of the power they need, when they need it. And you'll be able to best assess who actually needs his/her own 486 PC.

Easy to Set Up and Administer

DESQview/X asks three questions: Do you wish to transfer files to and from other computers? Do you wish to use programs on other computers? and Do you wish other people to have access to programs on your computer? That's all it takes for DESQview/X to set itself up. DESQview/X incorporates QEMM-386 to assure maximum memory utilization and Manifest for easy diagnosis and problem-solving.

Give your PC the key to unlocking and sharing the power of other PCs on the network.

DESQview/X is a graphical multitasking environment for DOS. It is so powerful that it literally turns DOS PCs into graphical workstations. With DESQview/X, you can run DOS and Microsoft Windows programs simultaneously, view them in windows, transfer between them, create DESQview/X-global or program macros and manage your files.

1991 BYTE AWARDS EXCELLENCE

DESQview/X makes computing lots easier, more productive, and more fun.

With DESQview/X, you can now run programs and access files on other computers on the network and view them in windows on your own PC. Distribute tasks among computers based on their capabilities and available resources.

Remote diagnosis and support is now a reality. With DESQview/X you can support, instruct; even remotely demonstrate programs right at your user's computer.

If you have X Window workstations, our optional 'DESQview/X to Other X Systems' TCP/IP Network Manager allows you to run workstation programs remotely from PCs.

For all this power, DESQview/X is stunningly easy to set up and use, and can run on any 386 or 486 PC with as little as 4MB RAM and 40MB hard disk.

DESQview/X multiplies the power of networked PCs by erasing the boundaries between computers; between programs and between users. Welcome to the limitless future of enterprise-wide computing.

Yes! Please Send:

Qty	Product	5-1/4	3-1/2	Each	Totals
	DESQview/X			$275.00	
	DESQview/X Network Mgr. (TCP/IP)			$200.00	
	OPEN LOOK interface			$200.00	
	OSF/Motif interface			$250.00	
				Shipping & Handling $10 (Canada & USA only)	
				California Residents add 8.25%	
				Grand Total	

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Edited by RUSSELL GLITMAN

Now Windows Does What It's Told

Windows Sound System Offers Voice-Activated Tool Bar and Menus

The noise level in corporate offices is about to rise as Microsoft ups the volume on business audio. With its under-$300 Windows Sound System, you can run *Windows* applications with your voice and have *Excel* and *1-2-3 for Windows* spreadsheets read to you.

Available in September, the Sound System includes an audio board, a microphone, headphones, and software that dramatically extends the audio capabilities of *Windows* PCs.

Using Sound System's Voice Pilot feature, you can issue voice commands to run the top 15 *Windows* applications, including all Microsoft applications, *PageMaker, 1-2-3 for Windows, Micrografx Designer, Norton Desktop,* and *WordPerfect for Windows.* The customizable vocabulary of menu structures also lets you create macros that run on voice commands.

Another feature is Proofreader. Highlight a section of your spreadsheet, and Sound System will read it back to you. Support is limited to numbers and spreadsheet terms: Proofreader's 170-word dictionary includes numbers, days, and months plus currency and spreadsheet terms.

The Sound System's Quick Recorder uses *Windows'* OLE capability to let you record from within OLE-aware applications or insert sound objects with a simple drag-and-drop function.

Soundboard installation has frustrated many users, so Microsoft has gone to great lengths to ease the process. Memory conflicts are handled completely in software, and there is but a single jumper. Should you run into trouble, an image of the board pops up with visual instructions on how to change the jumper.

For an early look at the product's core features, take a listen to Compaq Computer's Business Audio line. Sound System is basically a software extension to that product, according to sources close to Microsoft. —*Russell Glitman*

Its master's voice? Microsoft's Sound System includes a variety of features to let you control your Windows applications.

Drive Windows by the Light of the Dashboard

Hewlett-Packard's $99 Dashboard puts Windows' program, screen, and resource management into a compact horizontal bar. Along the top, a row of buttons gives you access to your Program Manager groups. Below, you can set up buttons for commonly used applications, manage up to nine virtual screens, and easily select printers. The "gas gauge" shows you how much free memory you have remaining.

Lotus Wins on 1-2-3 Copyright

The optional *1-2-3* menus in Borland International's *Quattro Pro* are no more. Their demise is the result of an August federal court ruling that Borland infringed on Lotus Development's copyrights. Borland moved quickly to strip the menu option from *Quattro Pro* and the upcoming *Quattro Pro for Windows* and will pay damages to Lotus.

The ruling by Judge Robert Keeton in Boston was expected since Keeton found for Lotus two years ago in a similar case against defunct Paperback Software. While the overall issues of copyright protection for software remain as clear as mud, most legal experts describe the ruling as narrow and unlikely to alter software development plans.

Borland, which earlier this year was still heavily promoting the *1-2-3* menus as a way to ease the competitive upgrade path to its own spreadsheet, promptly reversed itself. "Ninety percent of our customers haven't used this feature," says spokesperson Steve Grady. "It has become virtually obsolete." Both versions of *Quattro* will continue to run most *1-2-3* macros, he adds. And of course users with versions of the software that include the menu option have nothing to fear should they continue to use it.

Analysts question why Borland stuck to its guns for so long. "Why get into a legal battle over a feature that your own research says isn't that important?" asks *Soft-letter* publisher Jeffrey Tarter.

—*Eric Bender*

Dealers Hurt by Price War

While price wars are causing losses and layoffs among hardware and software vendors alike, resellers too are feeling the sting of competitive pricing.

Signs that retailer profits will feel the impact of the supplier price wars are appearing. Take JWP, Incorporated, of Purchase, New York, which acquired Businessland last year. It took $64.5 million in charges against first and second quarter earnings to compensate for overvalued inventories. Then there's Egghead Software, which warned investors that lower-than-expected earnings were in the offing for the first quarter.

The price war comes as traditional dealers such as JWP, ComputerLand, and MicroAge face stiff competition from mail-order companies and computer superstores like CompUSA and BizMart. To find profits, they are looking at new opportunities or expanding complementary lines of business such as service. For instance, ComputerLand president Ed Anderson says that while service and training operations provide just 15 percent of his company's revenues, they provide 50 percent of the gross profit. "That tells you we're razor thin in our product margins," Anderson says.

Mom-and-pop shops are hurting too. "I could sell a hundred computers a month and go broke," says Bill Yerger, owner of Microworld in Berkeley, California. "You're talking less than 10 percent profit now on anything."

Times are equally hard for software resellers. Egghead Software of Issaquah, Washington, blames its reduction in earnings in part on the drop in software prices and disappointing sales of *Windows 3.1*, which is increasingly bundled with systems or sold directly by Microsoft as an upgrade.

The tighter the squeeze on profits, the more likely a shakeout among dealers—particularly among those that depend on PC hardware sales for the bulk of their revenues, contends Lee Levitt, an analyst with International Data Corporation. —*Jeff Bertolucci*

		RAM	Hard disk	List price
AST	Brava 4/66d	4MB	120MB	$3195
Compaq*	Deskpro 4/66i	4MB	120MB	$2849
CompuAdd	466	4MB	80MB	$2649
Dell	486P/66	4MB	120MB	$2499
Gateway	4DX2-66V	8MB	340MB	$2995
HP*	Vectra 486U/66 PC	4MB	240MB	$4499
IBM	486DX2-66 upgrade card	4MB	n/a	$1670–$3000
PC Brands	486/DX2-66	4MB	105MB	$2495
Tandy*	4866 LX/T	4MB	n/a	$3799
Wyse*	Decision 486si	4MB	120MB	$2899

*Monitor extra.

The latest generation of PCs, based on Intel's powerful new 486DX2-66 chip, is finally reaching the market. Intel claims PCs based on this chip, which operates at 66 MHz internally and 33 MHz externally, will run 70 percent faster than 486DX-33 PCs. The DX2-66 is likely to remain the top CPU until early next year, when Intel plans to unleash the next generation of processors, the P5. Prices for complete 486DX2-66 systems start at about $2500. (Systems sold through resellers typically sell for 10 to 25 percent below list.) IBM, while not offering a DX2-66 system initially, is selling a DX2-66 upgrade board for its PS/2 Models 90 and 95.

Meca Struggles to Manage Its Money

Is the personal financial software market dividing into the *Quicken* and the dead?

Meca Software, home of *Andrew Tobias' Managing Your Money*, *TaxCut*, and other personal financial packages, lost a staggering $7.6 million on $20.6 million sales in the year ended June 30. The financial bloodletting is a result of a beating by competitors, particularly Intuit's *Quicken*, and Meca's purchase of Great American Software. With current assets dipping below liabilities, "Meca is on the endangered species list," says Jeff Silverstein, publisher of *Software Industry Bulletin*.

"Our financials don't look particularly rosy," concedes Meca president Daniel Schley. But he insists Meca is on the rebound. The key to the comeback is "major pricing action on all our products—positioning them to be directly competitive with far less rich products," says Schley. For example, pricing on *Managing Your Money* has been slashed from $220 to $80, which translates to about $49 on the street. At these lower prices, sales have boomed, Schley says.

The latest version of the flagship product, *MYM 9.0*, ships in September. Meca's ninth can be the "cornerstone of a financial management system," Schley says. It lets you automatically track bills paid electronically via CheckFree or BillPay USA, export financial data to *TaxCut* or *TurboTax*, and update investment data based on CompuServe or Dow Jones quotes.

Most of Meca's loss stems from the January purchase of Great American Software, whose *One-Write Plus* accounting line will become a big asset, Schley maintains. More than 5 million very small businesses with fewer than ten employees use a one-write ("pegboard") manual accounting system. Schley claims this group gives *One-Write* a big advantage over Intuit's much-applauded *QuickBooks* because "this is a product they already know how to use."

Still, Meca has been beset with development delays—for instance, only *TaxCut* comes in a *Windows* version. And personal financial software is a dogfight in which low prices eat profits. "The red flag is up," says Silverstein. "Meca better hunker down, cut expenses, and get product out the door in time." —*Eric Bender*

New Bravos Deserve Applause

This 486-heavy line offers low prices with high-end extras.

AST Bravos range from an AMD-based 386SX-33 equivalent to a 486-66; all include 4MB of RAM, a 16ms 120MB hard drive, and super VGA.

LUIS DELGADO

by Mike Hogan

What PC features are you willing to give up to get a low price? Drive bays? Expansion slots? CPU speed?

AST's revamped Bravo line meets or beats the new lowball pricing demands created by Compaq and others this summer without asking you to sacrifice any of the PC niceties to which you've become accustomed. AST was able to slash costs on its five small-footprint Bravos without cutting back on functionality. The result is 486 PCs at 386 prices, bolstered by the high-end features many competitors sacrifice—faster and upgradable processors, cache memory, on-board ethernet capability, additional video RAM, and noninterlaced monitors across the entire line.

Rather than the typical square printed circuit board, the Bravo motherboard is L shaped so that two boards can be stamped out of a single, standard-size PCB board at considerable cost savings. AST's in-house design and surface-mount capability save still more space by making the motherboard four layers rather than six. And the Bravos need less motherboard real estate because large-scale integration has cut their chip count in half. VLSI's new single core-logic chip replaces more than 30 I/O, cache control, and logic chips. Likewise, Cirrus's 5422 video controller integrates super VGA, hardware cursor, monitor, and 24-bit color control inside a single chip. It all adds up to a 40 percent reduction in motherboard costs—excluding processor and memory chips, which are market priced.

The Bravos include four 486 units and one 386 machine, all with processors and memory mounted on the motherboard. The 486s also have pin extensions to accommodate a daughtercard with cache memory and/or a faster processor. You can literally upgrade in a snap from the 486SX-25 Bravo 4/25s or from the 486DX-33 Bravo 4/33 to the 486DX2-50 4/50d or the 4/66d with Intel's 486DX2-66—the fastest Intel processor available to date.

486s at 386 Prices

AST also offers the Bravo 3/33s, powered by a 33-MHz AMD 386SX equivalent. It's packed with more features and has a lower price than Compaq's ProLinea 3/25s, but since you would save less than $300 over the upgradable 486SX-based 4/25s, why buy dead-end 386 technology?

The standard Bravo bundle is both inexpensive and robust. It includes 4MB of RAM, a 16ms 120MB hard drive, on-board super-VGA graphics backed by a generous 1MB of VRAM, and a 14-inch monitor.

Estimated street prices start at $1525 for a Bravo 3/33s—about the same as for a similarly configured Dell Dimension and at least $100 cheaper than a Compaq.

But the entry-level 486SX-based Bravo 4/25s costs only $1795, while the high-end Bravo 4/66d is a laughable $2875. When the first 486-based Bravo was introduced two years ago, it cost $4000.

The new Bravos have the same dimensions as the current line but offer four slots instead of five. One slot has been replaced by a set of motherboard pins that will take a $100 ethernet module or other as-yet-unnamed add-ons. All the 486s can be upgraded on the motherboard to 64MB of RAM using standard SIMMs. The 4/50d and 4/66d come with a 256K memory cache.

All in all, AST's recharged Bravo line offers a versatile mix of features and low prices that compete with anything on the market.

Mike Hogan is a senior editor for PC World.

SNAPSHOT

Bravo line

AST's new line offers more features for less.

KEY FEATURES

- **4MB RAM, 1.44MB floppy, 16ms 120MB hard drive**
- **Easy CPU and ethernet upgrades**
- **Super-VGA graphics**
- **Flicker-free, 1024 by 768 color monitor**
- **Four free 8/16-bit expansion slots**

AVAILABILITY

Immediate

PRICING

3/33s $1695, 4/25s $1995, 4/33 $2395, 4/50d $2795, 4/66d $3195; 16ms 210MB hard drive $845

AST Research Inc.
16215 Alton Pkwy.
P.O. Box 19658
Irvine, CA 92713-9658
800/876-4278
Reader service no. 692

Schedule+ for Windows: Group Scheduling Gets Coordinated

A personal and group calendar combines a sleek interface with E-mail integration for one of the cleanest scheduling packages yet.

by Bronwyn Fryer

Sure, software that schedules meetings for a large group of busy colleagues is great in theory. But in practice, such software has suffered from either an interface that fails to entice users or lack of integration with existing E-mail packages—sending everyone scurrying back to their dog-eared Day-Timers and endless rounds of annoying phone tag.

Microsoft's new *Schedule+ for Windows* may change all that—at least if you use *Microsoft Mail 3.0*. The product can be used as a personal calendar to keep track of appointments and tasks, but it really shines when you use it as a combination personal and group scheduler.

When connected to a *Mail 3.0* mail server, you can send invitations to meetings simply by clicking on a Send button. Responses come into your message in-box with different marks: A check mark tells you that a colleague will attend; a question mark means maybe; and an 'X' means he or she can't make it. When you accept or decline an invitation, *Schedule+* automatically notifies the sender.

By setting the appropriate permissions, you and your colleagues can view, modify, or create appointments in each other's schedules. If you have an assistant who keeps your calendar, he or she can schedule appointments or meetings in your calendar or add to your list of tasks without knowing your password. You can hide any appointment or task by marking it "private."

If you can't be bothered to find the best time for a meeting by looking at colleagues' schedules, the program will find an open slot for you automatically. Click and drag appointments or schedule recurring appointments to make it simple to grapple with busy schedules.

A task list in *Schedule+* enables you to arrange tasks by priority and assign a due date. You can then plan time to work on a task during the day by copying the task to your appointment book.

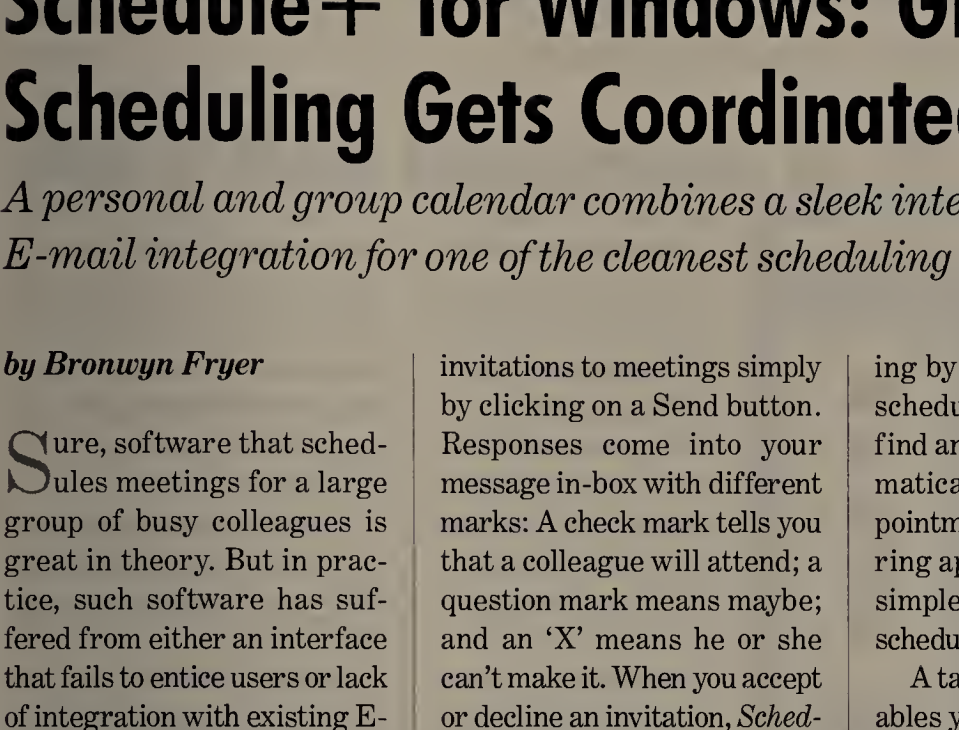
Schedules Unplugged

If you're going on a business trip, use your mouse to block out the days so your colleagues will know when you'll be out of the office. Schedule your own appointments during the trip in parallel—keeping side-by-side public and private calendars. You can print copies of your daily, weekly, or monthly appointments to fit in your pocket appointment book. You can't, however, print a handy all-in-one trifold, including your task list, as you can in *OnTime for Windows*.

When you're away from the office, you can use the remote copy of *Schedule+* to schedule appointments; when you link your mobile computer to the mail server, your schedule will be updated automatically. You can also convert your calendar to a hand-held computer such as the Sharp Wizard or the Hewlett-Packard 95LX. Finally, if you get lost, context-sensitive help and on-line tutorials help you find your way.

Users who have had an opportunity to work with the beta version of *Schedule+* rate the product high on a scale of 1 to 10. "I'd give it a solid 8.9," says Michael Falcone, a network and systems analyst at BCM Engineers in Plymouth Meeting, Pennsylvania. "What Microsoft included in the product they've done well; what they don't do well they've avoided completely."

Bronwyn Fryer is an associate editor for PC World.



Schedule+ for Windows shows you when colleagues are available for appointments, automatically selects the best meeting time, and lets you know who'll be coming.

SNAPSHOT

Schedule+ for Windows

WINDOWS Personal and group calendar lets you set and confirm appointments, share your calendar, and schedule tasks.

KEY FEATURES

- **Integration with Microsoft Mail 3.0**
- **Personal and group calendaring**
- **Task list assigns priority and due dates**
- **Tracks responses to meeting requests**
- **Auto-selection of time availability**

AVAILABILITY

Immediate

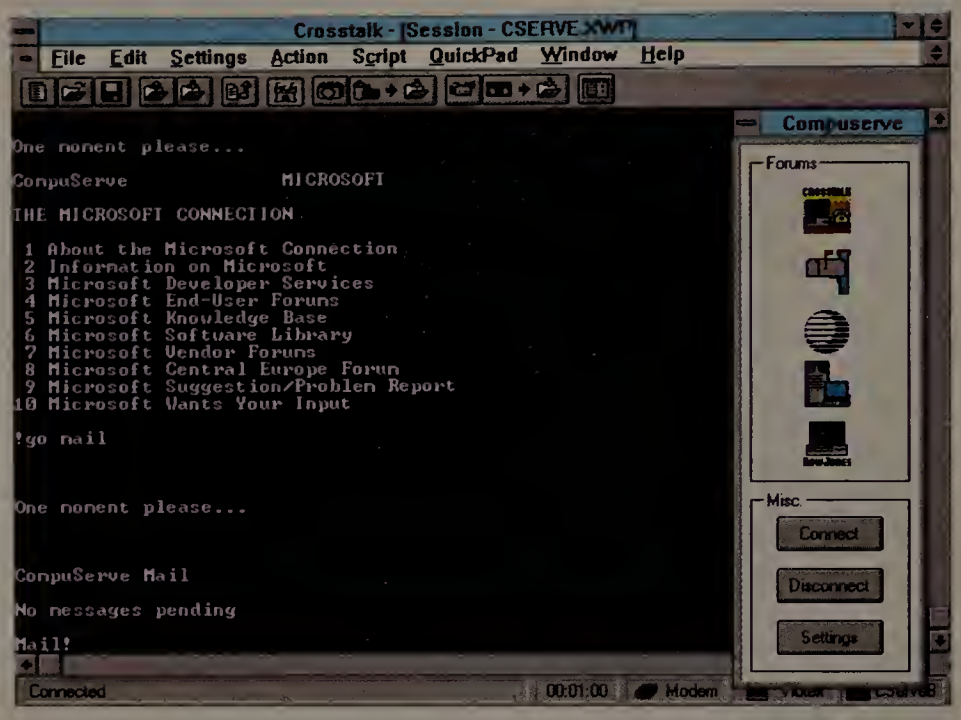
PRICING

Starter Kit including two workstation licenses $195. Additional workstation licenses: 5 units $395, 20 units $1349, 100 units $5500, 500 units $22,500

Microsoft Corp.
One Microsoft Way
Redmond, WA 98052-6399
206/637-9307
Reader service no. 696

A New Face for Crosstalk for Windows

A stylishly retooled Crosstalk revs up Windows communications with an icon dialing directory and on-line scripts.



On line on CompuServe with Crosstalk for Windows 2.0: A button keypad lets you click your way to mail, stock quotes, or your favorite services.

by Judy Heim

Two years ago the *Windows* communications market was like a museum stocked with the necessary artifacts but lacking any masterpieces. This new version of *Crosstalk* taps the *Windows* wellspring and offers an icon-based dialing directory, on-screen "quick pads" that let you launch on-line chores with the click of a button, a drag-and-drop object editor, graphical keyboard remapping, multiple communications sessions, built-in text and script editors, and much more. In fact, this new version resembles the old version about as much as *Windows* does DOS.

Go On Line With Icons

Modemniks will most appreciate *Crosstalk*'s long roster of premade scripts for dialing the major on-line services. Click on an icon in the dialing directory for, say, CompuServe or Dow Jones News/Retrieval, and *Crosstalk* walks you through an easy setup for the service. The program prompts you for name, password, and the like, then puts you on line with an on-screen keypad designed for the service.

On Dow Jones, on-screen buttons let you click your way to news, stock quotes, weather, a reference library, the data base menu, or the menu where you maintain a custom news profile. There are scripts like this for AT&T Mail, CompuServe, Delphi, Dialog, GEnie, Lexis, MCI Mail, NewsNet, and the *Official Airline Guide*. Other *Windows* communications packages, such as *MicroPhone*, have tried to offer this kind of functionality, but none have succeeded nearly so well. These scripts are excellent.

You can quickly customize the on-line keypads, or quick pads, with the drag-and-drop editor. Or, you can create your own on-line keypads for services you call. The editor works like a paint program. It lets you design movable keypads with buttons, boxes, lines, bit maps, and text. You then link keystrokes, on-line actions, or even scripts to the objects by selecting choices from pulldown menus.

A graphical editor lets you remap the keyboard to fine-tune terminal emulation or launch scripts or keystroke series with individual keys. In most communications programs, you need to know the keys' ANSI escape sequences to tweak your emulation; in the latest version of *Crosstalk*, you simply drag pictures of the keys onto a keyboard map.

New-Age Interface

Crosstalk's user interface bears scant resemblance to the old, in which you initiated all activities by choosing one of six words at the top of the screen. Most of the words are still there—File, Edit, Settings, Action, and Window, plus two new ones, Script and Quick Pad—at least while you're on line (the menu changes with whatever activity you have on screen), but now there's also an icon bar. Icons let you open, save, send, and receive files; run scripts; and take screen snapshots and send them to a file or printer. Unfortunately, the tiny gray icons tend to be cryptic and aren't readily understood.

Crosstalk's new terrain is more complex than the old. Each on-line service you call can have four types of setting files associated with it—its basic configuration or session file, its key mapping file, its quick pad file, and its script file. In addition, the old *Crosstalk* didn't have a built-in editor, forcing you to cut and paste text on line with Notepad. *Crosstalk* now has four built-in editors: one for writing and compiling scripts; a text editor; and the quick pad and keyboard editors. You can also create and save a work space just as you can with a spreadsheet program, so you can load any selection of screens and settings just by choosing an individual file.

The program touts 11 new terminal emulations plus the IBM file transfer protocol IND$FILE.

With this astounding transformation of features and appearance, *Crosstalk for Windows 2.0* jumps far ahead of the last version and sets the performance bar even higher for competitors in the *Windows* communications market.

Judy Heim is a contributing editor for PC World.

SNAPSHOT

Crosstalk for Windows 2.0

WINDOWS Crosstalk advances the state of the art in modem software.

KEY FEATURES

- **Icon-based dialing directory**
- **Icon-based scripts for on-line services**
- **Drag-and-drop object editor**
- **Multiple sessions**

AVAILABILITY

September

PRICING

$195

Digital Communications Associates, Inc.
1000 Alderman Dr.
Alpharetta, GA 30202-4199
800/348-3221,
404/442-4000

Reader service no. 738

Edited by RUSSELL GLITMAN

Dell's New Dimension in PC Pricing

Response to Compaq's price cuts is an aggressive line of two dozen feature-packed tower, desktop, and notebook models.

In case you were on your annual pilgrimage to Kathmandu this summer, the hot months in the United States saw the bottom fall out of PC prices as vendors scrambled to get under the new low ceiling established by Compaq's ProLinea and Deskpro/i PCs.

Dell's new budget-minded Dimensions range from a 25-MHz 386SX to a 50-MHz 486DX2.

Dell's reaction came in the form of two dozen aggressively priced Dimension PC models designed to prove that even the obsessively budget-minded can still enjoy full PC functionality.

The Dimension series includes five desktops, two floor-standing models, and a pair of notebooks that you can order with 386 or 486 processors, 2MB to 64MB of memory, and 40MB to 320MB hard drives. Prices are lower than an armadillo's belly, despite the fact that Dell has upped the ante for competing service and support players.

Desktop models start with a 386SX-25 that comes configured with 2MB of RAM, an 80MB hard drive, and a super-VGA noninterlaced monitor for $1359. You can probably find a comparably configured Compaq ProLinea 3/25zs for about $150 less on the street, but it will have one less floppy drive, one less expansion slot, and one less bay and will lack a few other extras such as *Windows*. Dell's 33-MHz 386DX-based Dimension, otherwise configured like its entry-level sibling, is $1649.

Dell widens the features gap as you step through its 486-based desktop and floor-standing lines, both of which are available in 486SX-25, 486DX-33, and 486DX2-50 flavors. The desktops offer six slots and five drive bays, while the floor-standing models have six of each. All ship with 4MB of memory expandable to 64MB, 512K of video RAM expandable to 1MB, dual floppy drives, DOS 5.0, *Windows*, a mouse, and a noninterlaced, 14-inch, super-VGA color monitor. The 486DX-33 desktop with a 120MB hard drive is only $2099. The basic floor-standing 486DX2-50 that has 8MB of RAM is $2699.

Of course, the Compaq Deskpro/i's have some unique features of their own that shouldn't be minimized. Most notable is Compaq's QVision Graphics—among the fastest, if not the fastest, graphics currently available on a standard PC—and a new business audio recording and annotating capability built into the Deskpro/i motherboard.

Dell's pair of 6.3-pound Dimension notebooks offer a good balance of functionality, size, and price. The NL20 and NL25 are nearly identical 386SL-based notes; the former is a 20-MHz version with a choice of a 40MB or 60MB hard drive; the 25-MHz NL25 offers a 60MB or 80MB configuration. The NL25 also has a 64K cache and a 9½-inch diagonal VGA LCD instead of the NL20's 8½-inch display.

Service and support, rather than price, have always been the principal reasons to buy Dell. The company pioneered free on-site support—now an industry standard. The Dimension line offers the familiar 30-day money-back guarantee, one year of toll-free technical support, second-business-day on-site repair for desktops, and 48-hour turnaround on repair or replacement of notebooks. Users also can take advantage of 24-hour automated answers to common problems via phone, fax, BBS, and CompuServe. Note, however, that this service and support falls short of the new lifetime guarantees Dell introduced for the Performance line concurrent with the Dimension announcement.

Dell offers other models with still more support and feature enhancements bundled in, but if you're on a budget, the Dimension line is one way to get the most for the least. —*Mike Hogan*

IN BRIEF

Dell Dimension PCs

Dell fires back with a new low-end line that beats Compaq prices while offering more features.

Dell Computer Corp.
9505 Arboretum Blvd.
Austin, TX 78759-7299
800/289-3355,
512/338-4400
Reader service no. 697

Windows Speed With Epson 486/Wingine PC

One of a new class of Windows-ready PCs, Epson's 486/Wingine takes advantage of Chips and Technologies' speedy 64200 Wingine Accelerator chip to boost Windows performance.

With the majority of *Windows* sales going to first-time users, Microsoft is working with hardware vendors to promote a new class of *Windows*-ready PCs. A distinguishing feature on these PCs is an accelerator chip designed to make *Windows* and *Windows* applications run faster.

One of the first of this new breed is Epson's line of 486/Wingine PCs, which integrate Chips and Technologies' 64200 Wingine Accelerator chip. These systems are targeted at power users running presentation graphics, desktop publishing, and computer aided design software.

The Wingine accelerator is a motherboard alternative to *Windows* accelerator cards, such as those based on the S3 chip. The Wingine propels video data from the CPU directly to video memory, avoiding wait states. According to C&T, the Wingine chip runs *Windows* faster than S3-based boards that were on the market this past summer. Unfortunately, there's no gain for DOS programs.

Epson has combined its Wingine implementation with a "virtual cache" innovation that allows the system to access dynamic RAM at the same rate as the static RAM secondary cache used by most systems. The company claims the virtual cache also increases *Windows* performance.

Epson's upgradable 486/Wingine PCs come with 4MB of RAM and six ISA expansion slots and support up to 1024 by 768 video resolution with 256 colors. You can select from 486SX-25, 486DX-33, and 486DX2 processor cards. No prices were set at press time, but volume pricing on the Wingine was a bare $18 per chip, so the added features shouldn't add much to the bottom line you'll pay for these PCs. —*Jeffrey Gordon Angus*

IN BRIEF

Epson 486/Wingine PCs

The first line of 486 PCs to use Chips and Technologies' Windows-acceleration technology.

Epson America, Inc.
20770 Madrona Ave.
Torrance, CA 90509-2842
800/922-8911
Reader service no. 698

Zenith Redesign Focuses on Upgrades, Networking

Zenith Data Systems has revamped its entire product line with the release of a new desktop family, two new portable lines, and a suite of new servers, all of which are designed to make upgrading and networking as easy as possible for the user.

You can see this new design philosophy at work as soon as you pop open the Z-Station desktops. An understandable map on the power supply identifies dedicated slots for memory, network cards, the optional video accelerator, and the SCSI adapter upgrade (standard systems come with integrated super-VGA and an IDE hard drive). Floppy and hard drives pop out of their brackets with the press of a tab. Processors in ISA machines sit in low-insertion-force sockets, while EISA systems use modular cards.

For networking, the Z-Stations come with a modular ethernet board. Shells for Novell's NetWare, Banyan's VINES, and Microsoft's *LAN Manager* are factory installed, so you should be able to hook them up to an ethernet network right out of the box. The Z-Stations start at $1699 for a 386SX-25 with an 80MB hard drive and 4MB of RAM (expandable to 64MB for ISA versions and 128MB for EISA) and extend up to $3499 for a 486DX2-50 with a 200MB drive.

The Z-Note portables have the same connectivity features as the Z-Stations. You also get the option of a ReadyDesk docking station, with super-VGA monitor output and plenty of ports. You don't need a screwdriver to upgrade memory, math coprocessor, or modem, and you can swap your monochrome LCD display for active-matrix color. Z-Notes start at $1999 for a 386SL/20 with a 60MB drive; the 386SL-25-based active-matrix model with a 120MB drive is $4999 (see August *New Products*). The Z-Sport portables are ZDS's low-end line. They don't give you all Z-Notes' connectivity options, but prices start at $2199.

At the top end, the Z-Server EISA towers give you a generous eight 32-bit expansion slots and room for as much as 192MB of RAM. They come in 486SX-25, 486DX-33, and 486DX2-50 configurations.

New Z-Vision monitors include 17- and 14-inch color and 14-inch monochrome models.

Although you can find systems for less, ZDS is betting that when you add up the personnel costs of maintaining, upgrading, and networking other vendors' offerings, systems that are easy to use and connect will actually save you money. —*Dan Miller*

IN BRIEF

Z-Station, Z-Note, Z-Server, Z-Sport

Easy upgrading and networking in four new product lines.

Zenith Data Systems
2150 E. Lake Cook Rd.
Buffalo Grove, IL 60089
800/553-0331
Reader service no. 699

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LAN TIMES READERS CHOICE 1992

Computer Reseller News Editors' Choice

1991, 1990

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	Back-UPS 400	Desktop 386, 486 systems, 286 servers	~~$249~~	$229
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Circle 45 on reader service card

TravelMate 4000: Notebooks Built for Windows

The new trio of 486 TravelMate 4000 notebooks from Texas Instruments deliver faster *Windows* performance and claims of improved battery life at a lighter-than-ever 7-pound traveling weight (including AC charger, power cords, and a TravelPoint trackball).

With the TI TravelMate 4000 notebooks, Windows is ready to go to work just 40 seconds after you flick on the power.

The WinSX/16, the WinSX/25, and the flagship WinDX/25 come with *Windows 3.1* installed and boast an optimized BIOS and a video system to make *Windows* run fast. You also get a 10-inch-diagonal screen with a handy switch that reverses the LCD video display without deranging the output to an external CRT. The keyboard has a terrific touch and features standard placement for all control keys. However, page control keys, <F11>, and <F12> require the simultaneous press of the <Fn> key.

With a power-hungry 486 CPU under the hood, power management is more important than ever. Even TI's 286-based notebooks boasted BatteryPro features such as CPU slowdown between keystrokes. According to TI, this latest iteration of BatteryPro actually improves on the latest APM (Advanced Power Management) technology. Best of all, you can view and adjust all power-management features from a *Windows* menu. Some of the options are extremely slick. You can, for instance, set the notebook to slow its CPU automatically for battery operation and speed it up if AC power is enabled. Or you can choose one of four preset power-saving levels—two of which won't cause the slightest slowdown in your work.

TI claims you'll get 4 to 5 hours of battery life from these 486 TravelMates. Your experience may vary. (Battery life depends on a complex constellation of factors.) TI claimed comparable battery life for the TravelMate 3000, but *PC World* tests found a battery life of 4 hours and 15 minutes with all power saving enabled and a scant 1 hour and 49 minutes with power saving disabled.

You'll find these TravelMates aggressively priced: The WinSX/16 comes in at $3199 with 4MB of RAM, an 80MB hard disk, and a TravelPoint trackball. The WinSX/25 (similarly configured except for a 120MB hard disk) runs $3799. The top-of-the-line WinDX/25 will cost you $4399.

—Michael Goodwin

IN BRIEF

Texas Instruments TravelMate 4000 Series

Optimized for Windows and boasting power-saving features that better APM, these notes are hard to resist.

Texas Instruments, Inc.
Information Technology Group
P.O. Box 202230
Austin, TX 78720-2230
800/527-3500
Reader service no. 700

QMS's 600-dpi Multinetwork Laser Printer

The QMS 860 8-ppm laser is the first printer to use Canon's new LBP-BX 600-dpi engine, but it won't be the last.

Designed for true 600-by-600-dpi output, the Canon engine uses an ingenious optic system that more accurately focuses dots on the printed page and introduces a successor to the Microfine toner cartridge—called Ultrafine—that reduces variance among the dots. The result is super-crisp type that compares favorably with output from much higher priced printers in the 1000-dpi class.

In its standard 12MB configuration ($4595), the 860 also supports up to 11- by 17-inch/A3 printing at 300 dpi. Installing a 4MB SIMM module adds the muscle for 600-dpi 11-by 17-inch output; the printer holds up to 32MB of memory.

The 860 laser also features QMS's Crown multitasking system. The Crown system, which first debuted on QMS's $15,995 PS2000 model, is best understood as a printer-resident operating system that takes advantage of the 860's 25-MHz Intel 80960CA RISC processor to compile, rasterize, and print separate jobs simultaneously.

In addition to enabling automatic switching among the printer's resident languages—PostScript 1 and 2, HP PCL 4, and HP-GL—the Crown system provides other network-ready features, such as printer-resident spooling and simultaneous interfacing between the built-in LocalTalk protocol and options for NetWare ethernet ($995), EtherTalk ($995), TCP/IP ($1295), DECnet ($1795), and in November, token ring ($1195).

The 860 includes 35 PostScript fonts and four typefaces from the Helvetica condensed family. It reduces repetitive downloading to the printer by preserving fonts, macros, and other data downloaded for one job when the user switches to another emulation. QMS includes its PS Executive collection of utilities, which enable you to perform screen captures and dumps, create printer definition files for various graphics and word processing applications, and create utilities to align text and graphics on a page. *—Bruce Kinnaird*

IN BRIEF

QMS 860 600-dpi RISC-Based Multinetwork Laser Printer

A fast, affordable 600-dpi multitasking PostScript laser printer capable of working in multiple operating environments.

QMS Inc.
One Magnum Pass
P.O. Box 81250
Mobile, AL 36689-1250
800/631-2692,
205/639-4400
Reader service no. 701

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Imagine a portable PC that lets you send and retrieve your e-mail, modem a memo to the home office, write reports, create spreadsheets, manage your calendar, calculate your expenses... *work non-stop for ten hours*... and is so portable that it weighs about the same as a notepad.

A futuristic fantasy? Not unless the future is now. It's the ZEOS Pocket PC, and only ZEOS has it! You're going to love how portable and affordable it is. In fact, we think you'll find it's the one PC you'll want to take with you everywhere!

COMPACT YET COMPLETE. 1.3 lbs!

At only 9⅝" x 4½" and only 1.3 lbs., what's great about the ZEOS Pocket PC is that it has a keyboard you can really use. If you're accustomed to typing with both hands, switching to a palmtop PC can be awkward because the keyboard only lets you type with one hand or even one finger. Yet the ZEOS Pocket PC's keyboard lets you use both hands easily, so you won't sacrifice comfort and speed for portability.

And even though it's small, the ZEOS Pocket PC carries a *full suite of industry standard software* already loaded and ready to go! You get *Microsoft DOS 5.0* system files with built-in file transfer and *Microsoft Works 2.0* with word processing, spreadsheet, database and communications programs. Plus, you get a personal organizer which includes a calendar/planner, "to do" list, business card file, information retrieval (for country codes, converting measurements and currency) and more. It's everything you need to manage your life!

IT JUST KEEPS GOING . . .

Ten hours of continuous use? Absolutely! All it takes is the two AA alkaline batteries included with your system. And your ZEOS Pocket PC has great power management, too—it automatically switches to the suspend mode when you take a break. Plus, when you turn off your system, then turn it on again, it goes right back to where you left off. What a time-saver!

STAY IN TOUCH.

Modem a memo to a client; send and retrieve your e-mail. With the Pocket PC's optional fax/modem, you can communicate worldwide. Plus, expanding the memory is another easy option—with an additional memory card that slips right into a slot on the system's underside. And that's not all.

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PC Magazine, in their recent Service and Reliability issue said, "Only ZEOS portable PCs achieved significantly higher-than-average ratings in all four categories." The four categories were *reliability, future purchase plans, repair service satisfaction* and *technical support.* And remember, ZEOS technical support is 24 hours a day, 365 days a year, and always toll-free. And we back every ZEOS purchase with our 30-Day Absolute Satisfaction Money-Back Guarantee, One Year Limited Warranty and more.

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ZEOS® INTERNATIONAL, LTD.

Circle 219 on reader service card

Wyse's 5-Pound Notebook

The Wyse DecisionMate 486SLC weighs just 5 pounds but includes an 8.5-inch sidelit VGA display and a 120MB or 200MB hard drive.

One sure way to trim the weight of a notebook is to leave out the floppy drive. Both Dell Computer and Gateway have taken this approach with their new subnotebook PCs, and now Wyse Technology is going the no-floppy route with its 5-pound, $2299 DecisionMate 486SLC Model 80/4.

Measuring 8.6 inches deep, 11 inches wide, and 1.5-inches thick, the DecisionMate is a shade slimmer that most 6-pound notes. Its 8.5-inch sidelit LCD screen is smaller than those of standard 10-inch notebooks, but it displays crisp VGA graphics with 32 shades of gray. The 79-key keyboard doesn't have the cramped feel you might expect from a downsized notebook, and it includes dedicated cursor keys in an inverted-T layout (the cursor keys double as <Page Up>, <Page Down>, <Home>, and <End> keys).

Powered by Cyrix's 25-MHz 486SLC microprocessor—a low-voltage CPU that's compatible with the 486 instruction set—the DecisionMate has 4MB of RAM (expandable to 8MB), an 80MB hard drive, and a removable nickel-cadmium battery that offers 2 to 3 hours of computing power. *Windows* users may opt for a DecisionMate with a 120MB hard drive ($2699) or 200MB hard drive ($2899).

—Jeff Bertolucci

IN BRIEF

DecisionMate 486SLC

A slim, 5-pound notebook from Wyse Technology that comes with an external floppy drive.

Wyse Technology Inc.
3471 N. First St.
San Jose, CA 95134
800/438-9973,
408/473-1200
Reader service no. 702

High-Res Color by the Numbers

If you're a 3-D CAD jock, presentation graphics pro, or high-end desktop publisher, 256 colors just aren't enough. To take advantage of *Windows*' full 16 million colors, you need a multiscan monitor and a heavy-duty video setup. Number Nine's #9GXiTC video board gets you halfway there, bringing high-resolution, real-life color to your screen for $2295.

The #9's 40-MHz TMS 34020 processor and custom silicon promise to crank out sharp, colorful screens in the blink of an eye. The #9's 32-bit color capabilities let you create an 8-bit text overlay on top of a 24-bit scanned image. The board supports noninterlaced resolutions from 640 by 480 up to 1280 by 1024, all at a flicker-free 72-Hz refresh rate. You can view up to 16.8 million colors at 1024 by 768 resolution and 65,536 at 1280 by 1024.

With 4MB of video RAM standard, you can create a virtual screen of up to 2048 by 2048. You can run full-screen apps side by side and move between them by sweeping the mouse to the edge of the screen without having to wait for the screen to redraw.

You can use #9's built-in VGA support or pass through to your existing VGA board. You can even hook up a second monitor to the board and run it at a different resolution—ideal for applications that let you display an overview of the entire image on one monitor while zooming in for detail work on another.

A unique zoom feature lets you magnify screen images from 200 to 1600 percent at the tap of a key. You can even change the color of your cursor to make it easier to find.

—Daniel Tynan

IN BRIEF

Number Nine #9GXiTC

This $2295 video board cranks out high-resolution screens in more than 16 million colors.

Number Nine Computer Corp.
18 Hartwell Ave.
Lexington, MA 02173
800/438-6463,
617/674-0009
Reader service no. 703

Import VCR and TV Images Into Windows

Did you ever wish you could bring that perfect image from your television, VCR, or camcorder into your PC to add some sparkle to a presentation or a desktop published document?

A new piece of hardware from Creative Labs, the maker of Sound Blaster, gives you an inexpensive way to do just that. Video Blaster enables *Windows* users to grab a frame from nearly any video source, bring it into a window, scale it up or down, and adjust its hue, saturation, contrast, and brightness.

You can also capture and mix audio input to run with the 640 by 480 resolution VGA or super-VGA images you bring in. The $499.95 Video Blaster also includes Mathematica's image editing program, *Tempra*, in addition to three multimedia packages—*Action*, *TempraShow*, and MacroMind's *MMPlay*.

JPEG compression is also built into Video Blaster. When this technology is used with color desktop publishing and live, self-running presentations, Creative Labs believes, it will prove useful for continuous viewing of broadcast news and stock market quotes.

—Steve Fox

IN BRIEF

Video Blaster

Freeze frames from almost any video source for input into Windows.

Creative Labs, Inc.
1901 McCarthy Blvd.
Milpitas, CA 95035
800/998-5227,
408/428-6600,
408/428-6611 (fax)
Reader service no. 704

Easy is clicking on a folder and seeing all the spreadsheets and documents for your weekly report. Then in one mouse motion, dragging them to a printer icon and dropping them to print.

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Circle 97 on reader service card

Media Vision's Low-Cost Audio/Video Card

If you're interested in advanced graphics and sound but aren't ready to junk your PC for an expensive multimedia system, you might take the piecemeal approach: graphics and sound today, CD ROM drive and other components tomorrow.

Priced at $349, Media Vision's Thunder & Lightning combines 24-bit VGA graphics and 8-bit sound on a single expansion card. While not a complete multimedia solution, Thunder & Lightning lets you add voice messages to word processing and spreadsheet files (you'll need a microphone), spruce up computer-based presentations with music and narration, and edit high-resolution graphics images using graphics and CAD software.

Media Vision's Thunder & Lightning, a $349 add-in card that combines 24-bit VGA graphics and 8-bit sound, can get you started on the road to multimedia.

The board offers 8-bit sound recording and playback—good for voice annotation and simple recordings but certainly less sophisticated than CD-quality, 16-bit audio. It also supports simultaneous playback of up to 11 different sounds—useful for presentations. Audio I/O ports enable you to connect an external microphone and speakers; a MIDI interface is handy for musicians with MIDI-compatible instruments. Thunder & Lightning is compatible with both Sound Blaster and Ad Lib sound boards, so you can run software that supports either of these products, according to Media Vision.

Thunder & Lightning's 24-bit color and 1MB of RAM give you an almost infinite palette of 16.8 million colors at standard VGA (640 by 480) resolution. At the board's maximum 1024 by 768 resolution, you can choose from 256 colors.

You won't have to spend several hundred dollars more on software, either. Bundled applications include *Lotus Sound,* Lotus's new program that lets you add voice messages to documents in *Windows* applications; First Byte's *Monologue for Windows,* a *Windows* text-to-speech conversion program; and *MasterTracks Pro,* a MIDI recording and editing system.

—Jeff Bertolucci

IN BRIEF

Thunder & Lightning

An audio-video board that combines advanced graphics and sound—plus an impressive software bundle.

Media Vision, Inc.
Gateway Bldg.
3185 Laurelview Ct.
Fremont, CA 94538
800/847-5870,
510/770-8600
Reader service no. 705

Printer Solutions for Work Groups

A fast, workhorse printer like the Hewlett-Packard LaserJet IIISi is almost a necessity in today's office environment, but reading up on LANs to figure out how to share the printer can shut your eyes faster than a page of Proust.

ASP's ServerJet Si is a non-LAN solution for sharing the HP IIISi among up to seven PCs. The ServerJet board, which plugs into the LaserJet IIISi's modular input/output slot, has six serial ports and one parallel port. Any PC located within 1000 feet of the ServerJet can connect to its serial ports using inexpensive telephone-type RJ-11 cable. Transmission rates are fast—up to 115.2 Kbps, 12 times faster than standard serial rates, with eight user-determined speeds.

The additional parallel port on the ServerJet can be used to connect an additional PC, or it can be software configured as an output port to an HP DesignJet Plotter. Pop-up menus enable users to choose between the two.

The ServerJet Si with 1MB of memory costs $795 and is upgradable up to 4MB; additional 1MB memory modules cost $195.

And for those who spend more time at the printer waiting for output than at their PCs producing it, Kansai Electric has introduced three new printer buffers. The EDB-30, EDB-40, and EDB-50 use Direct Memory Access (DMA) architecture on their input/output ports. DMA allows them to accept data from PC workstations at speeds up to 300 Kbps, about 30 times faster than similar products do. All the EDB buffers are available with memory ranging from 1MB to 12MB. Each buffer features three plug-in SIMM sockets that accept either 1MB ($149) or 4MB ($549) memory modules.

Each EDB model comes with one serial port. Available parallel ports, which can be reconfigured as output ports, vary with the model: The EDB-30 ($599) has three; the EDB-40 ($649) has four; the EDB-50 ($699) has five. For LAN systems that must handle heavy-duty user requirements, EDB buffers can be daisy-chained together in a variety of configurations to accommodate an unlimited number of computers and printers.

If you're trapped in an office where one person always seems to be printing 10MB graphics files, you'll appreciate the way the EDB buffers give priority to small print jobs if a larger job hasn't already started. *—Bruce Kinnaird*

IN BRIEF

ServerJet Si

An easy alternative to LANs for sharing a printer.

ASP Computer Products, Inc.
160 San Gabriel Dr.
Sunnyvale, CA 94086
800/445-6190,
408/746-2965
Reader service no. 706

EDB Series Printer Buffers

These buffers allow users to return to their applications quickly.

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408/377-7062
Reader service no. 707

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Minicartridge Tape Drive Comparison

	Iomega Tape250	CMS Jumbo	Irwin AccuTrak
QIC 80 Read & Write	•	•	
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Windows 3.1 & DOS software	•		
Fits standard 1" bay	•		
QIC 80 entry price	$299	$350	$349

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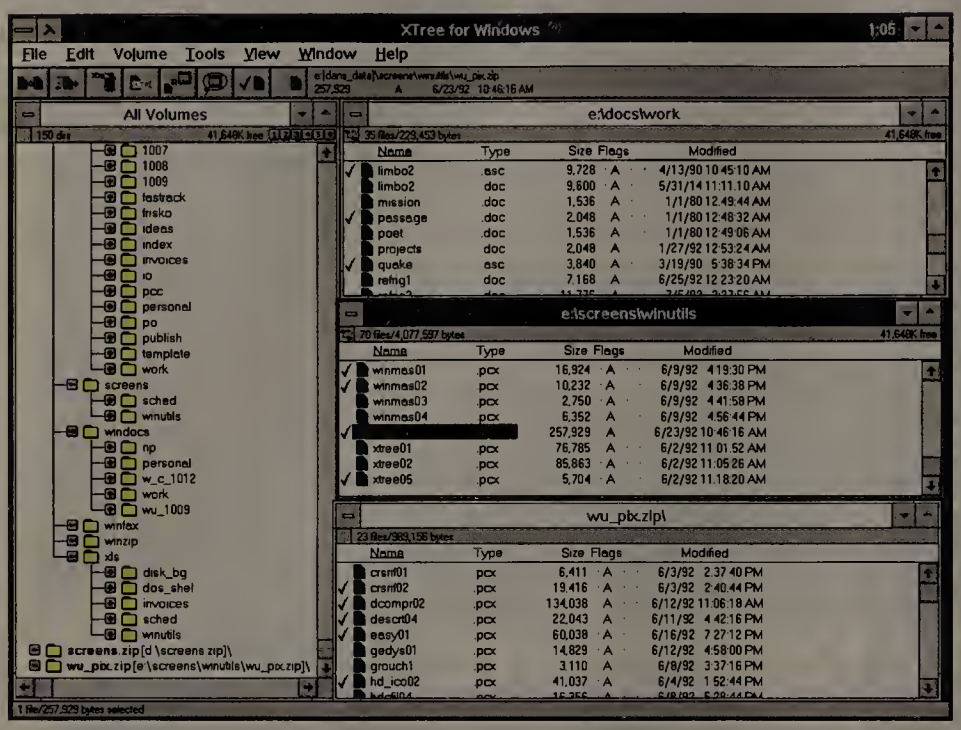
Circle 152 on reader service card

XTree Puts on a Windows Face

This venerable DOS file manager proves that you can teach an old program new tricks with point-and-click ease.



XTree for Windows' sleek icon-rich interface lets you peer inside ZIP archives and mark frequently used files for easy copy and move operations.

XTree, the perennial DOS file manager, has been transplanted to *Windows*. This $49.95 package trades the DOS version's quirky command structure for a sleek icon-based interface, adding file viewing and compression talents you won't find in *Windows'* File Manager.

XTree's fresh new interface opens to a directory tree on the left, with directory windows on the right and an 8-button icon bar across the top. You can expand or collapse the tree, open a virtually unlimited number of windows, and copy, move, or delete whole directories at once—all with a few clicks of the mouse.

Like *Windows'* File Manager, *XTree* lets you copy or move files by dragging them from one directory window and dropping them into another. But *XTree* extends this metaphor to file compression: You can create ZIP archives and drag files into them. The program treats each ZIP file like a directory, letting you scroll through a list of its contents, view files, and add or delete at will. You can also optimize ZIP files for size or speed and issue passwords to lock out prying eyes.

If you work over and over again with the same files, you will appreciate *XTree*'s unique marking feature, which lets you insert check marks next to file and directory names and keep them marked even after you close the directory window. Reopen the window, then choose *Select Marked objects only* from the Edit menu. Your files will now be ready to be manipulated.

It's also a lot easier to manage files when you can see what's inside them. That's why *XTree* has viewers for more than 50 types of spreadsheet, data base, word processing, and graphics files. Because the viewers come as separate DLL files, you will be able to download all new viewers from XTree's bulletin board as they become available, without having to upgrade the entire program.

Would you like to launch applications without futzing with *Windows'* Program Manager? *XTree* lets you start DOS or *Windows* applications by double-clicking on EXE, COM, BAT, or PIF files; or you can double-click on a file name to launch a program with that file loaded. However, if you want to change file associations—for example, to load TXT files into *Word for Windows* instead of into Notepad—you'll have to edit your WIN.INI file.

XTree for Windows still has some growing to do. Version 1.0 offers no built-in file printing and no way to jump quickly to a directory by typing in a name. And its file-find capabilities may leave users searching for more. You can hunt for files using multiple file extensions or date, time, and other parameters, but you can't save your search criteria for later use. You can search inside individual files for text strings, but you can't locate groups of files that contain your search text. And while *XTree* can display a list of, say, all the BAK files on your hard disk, getting at what you need is a bit of a struggle.

Still, if you're an old-time *XTree* user who's switched to a graphical environment—or if you are simply in search of an alternative to *Windows'* infamous File Manager—*XTree for Windows* should be welcome news indeed. The program requires *Windows 3.1* and 2MB of RAM. The normal $99 price has been slashed to $49.95 through October 1992; upgrades from *XTreeGold* will be $39.95, according to the company. —*Daniel Tynan*

XTree's 52 native file viewers—such as this PCX viewer—make it easier to whittle unnecessary files from your hard disk.

IN BRIEF

XTree for Windows 1.0

WINDOWS The Windows version of this DOS file-management standby features a slick icon-driven interface and a bevy of built-in file viewers.

XTree Co.
4115 Broad St., Bldg. 1
San Luis Obispo, CA 93401
805/541-0604,
805/541-4762 (fax)
Reader service no. 708

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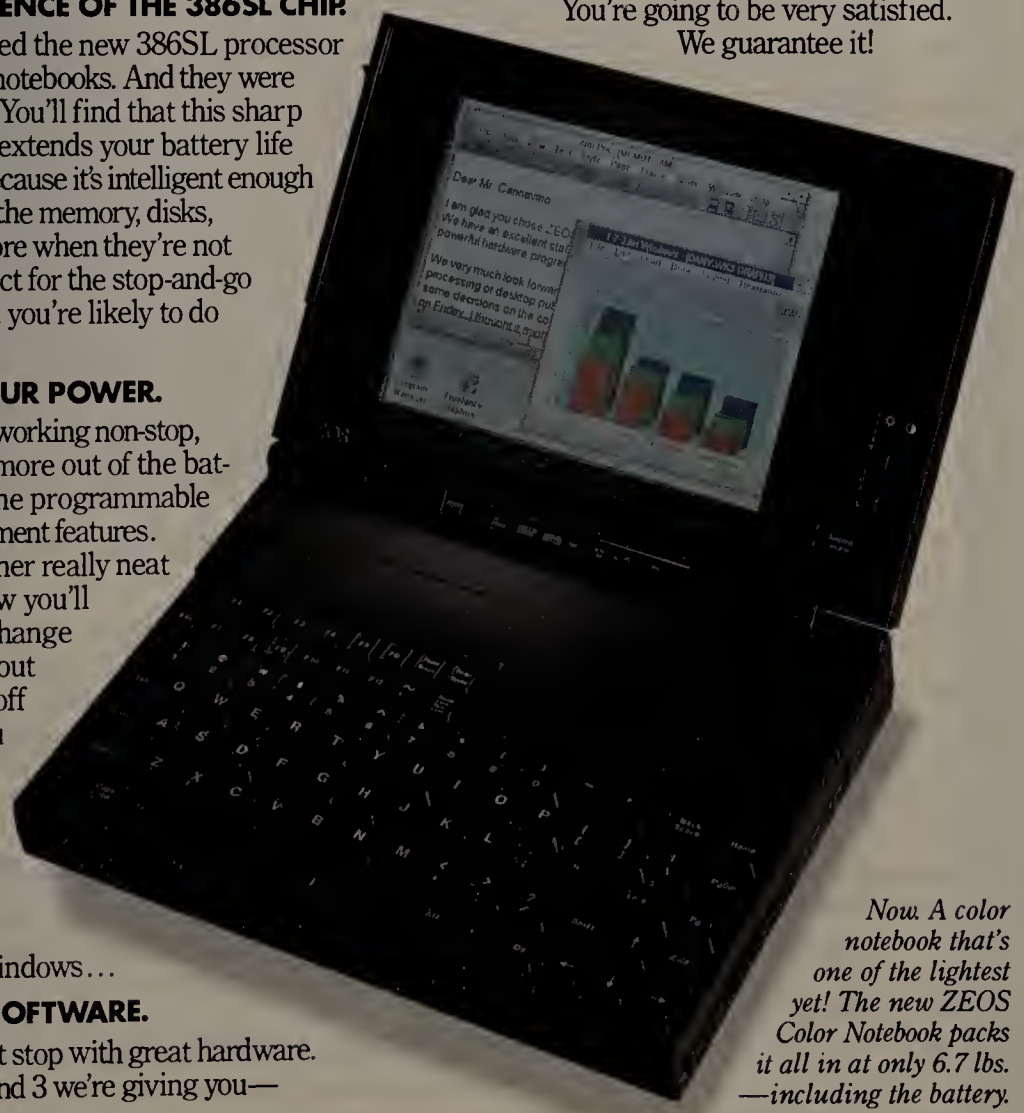

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Load up your Notebook! We've included free software, internal send/receive fax modem and more...all at an incredible price.

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- Custom-fitted carrying case.
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Go to 8MB of memory, 130MB hard drive, extra battery...this could be the only PC you'll ever need!

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- Custom-fitted carrying case.
- Additional NiCad battery.
- Genuine Microsoft Mouse.
- *MS-DOS 5.0, Windows 3.1,* and your choice of two *Windows* applications. Choose from *Lotus 1-2-3 for Windows, Ami Pro* and *Freelance Graphics for Windows.*

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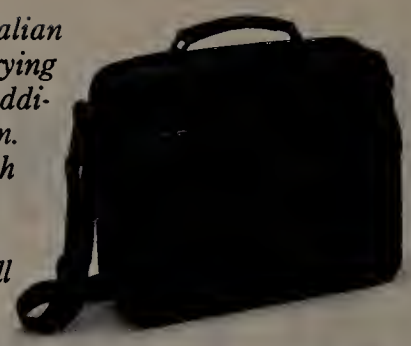
ZEOS INTERNATIONAL, LTD.

Circle 260 on reader service card

The only notebook with a tilt & swivel display. Great for sharing data or keeping it private. Easily adjusts for perfect viewing.

This fine Italian leather carrying case is an additional option. Loaded with pockets and features everyone will appreciate.



Digital brightness and contrast buttons make screen adjustment so easy.

ZEOS® Freestyle/SL. More features at a lower cost than any other notebook. Period.

To try and compare the new ZEOS Freestyle/SL to any other notebook is next to impossible. Because nothing else has all its features. And even with all these great features, nobody can match the price. Features and price. It would seem the new ZEOS Freestyle/SL is the best of all worlds. It is.

DESIGNED BY USERS. JUST LIKE YOU!

We asked our customers what it is they want in the perfect notebook. The first thing they told us is that most notebooks look like a cigar box with a lid. They told us they wanted not only good looks, but things like great power *and* great battery life. Lightweight too, like five pounds and change. And the keyboard should be effortless to use. The entire product had to be extremely durable. And that was just for starters.

SL POWER. SL BATTERY LIFE. 64K CACHE!

We listened well. Then we got down to work. For the chipset and CPU we selected the Intel 25MHz SL. We then built in a high-speed 64K SRAM cache as standard. We know this system might well replace a desktop for many users.

And power to your ZEOS Freestyle/SL system is provided by our advanced battery system. The fully enclosed lightweight battery packs easily snap in and out and can be quick-charged when the system is not being used or trickle-charged when in use. So what happens when the power is on?

GREAT VIDEO TOO.

You get great video! Because for video control, we chose the amazing new Cirrus Logic VGA controller. It not only consumes less power, it also produces the fast crisp images you're looking for. And with a business machine like this you'll also appreciate our dual display capabilities. You can connect an external VGA color monitor for simultaneous co-display. And that's not all.

A NOTEBOOK KEYBOARD YOU'RE GOING TO LOVE.

We re-designed and re-sculpted every key from scratch. Even the key-switch mechanism was invented anew. And we added the mouse key for easy cursor control. It is the absolute perfect notebook keyboard. What else?

Lots else! Like the best display system of any notebook available anywhere. We listened here too. The screen is big and easy to read. Plus, it's high contrast and it's fast. It's also very easy to adjust. People said contrast and brightness knobs were hard to use. So we replaced them with soft touch buttons that *electronically* adjust screen settings at your command. Then we really got creative.

THE ONLY NOTEBOOK WITH A TILT & SWIVEL DISPLAY.

Can you imagine your desktop PC without a tilt and swivel display? Neither could we. So why not incorporate that feature into a notebook. With the ZEOS Freestyle/SL notebook you can adjust the screen left and right as well as tilt it up and down. Now you can truly adjust your notebook screen to the perfect viewing angle.

IT FLOATS TOO.

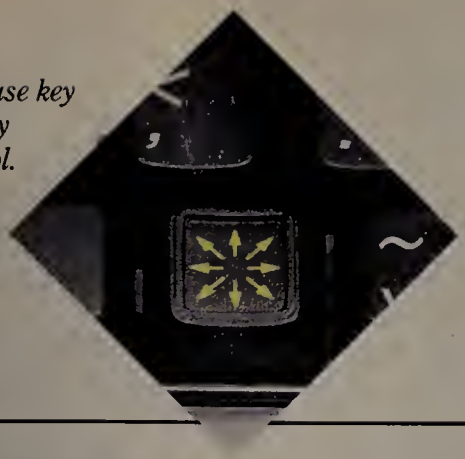
And then there is the "floating" screen. When you're facing your new ZEOS Freestyle/SL, the screen actually appears to "float" in the air in front of you. It's the only notebook that can really be used sitting on your lap!

EXTRA, EXTRA, EXTRAS. READ ALL ABOUT 'EM!

We've made more options available than ever before. Like our modem with send/receive fax. And memory up to 20MB, hard drives to 180MB, even an optional Italian leather carrying case! Extra batteries and a charging stand are available too. Call 800-423-5891 for all the details.

2MB, 60MB Only $1895!

Built-in mouse key provides easy cursor control. Leave those bulky mice behind!



This sliding port door won't break off or come loose. Saves your fingers too.

ZEOS. #1 RATED NOTEBOOKS, SERVICE & SUPPORT!

PC Magazine recently surveyed notebook users for their Service and Reliability issue. Their findings? "Only ZEOS portable PCs achieved significantly higher-than-average ratings in all four categories." The categories were reliability, future purchase plans, repair service satisfaction and technical support. And remember, ZEOS technical support is 24 hours a day, 365 days a year, toll free. And we back your new ZEOS Freestyle with our 30-Day Absolute Satisfaction Money-Back Guarantee, One Year Limited Warranty and more.

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Circle 251 on reader service card

NEW ZEOS FREESTYLE/SL
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- Intel 25MHZ 386SL, 64K cache!
- 2MB RAM standard, expandable to 20MB.
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ZEOS® INTERNATIONAL, LTD.

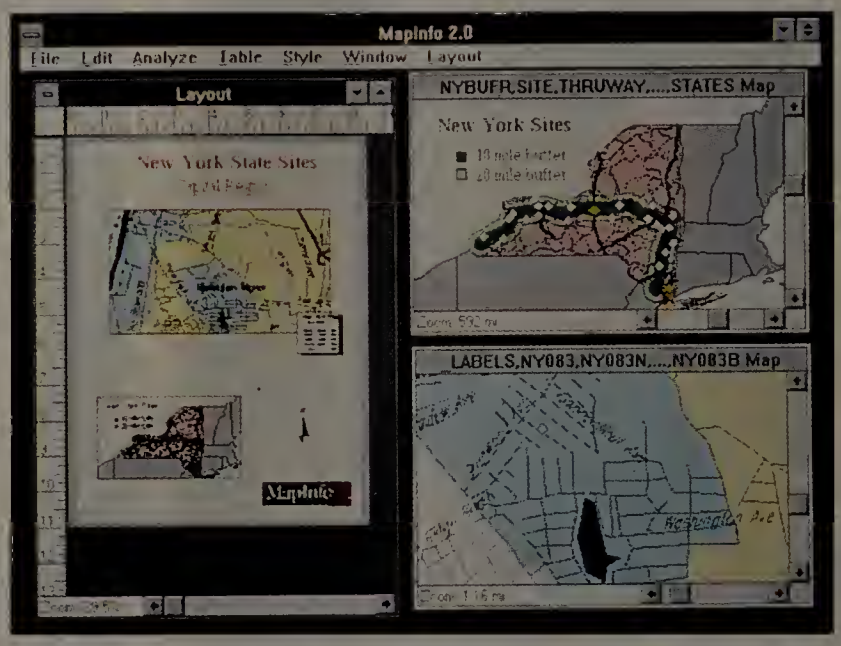
MapInfo 2.0 Charts New Territories and Trends

Mapping programs extract spreadsheet and data base information and display it on a map to reveal patterns, trends, and relationships that might otherwise go unnoticed.

The $995 *MapInfo 2.0* includes an assortment of new tools for making analytical decisions based on map data. A feature called Buffering surrounds a line (such as a road) or area at a specific distance so a user can search for, say, all the sales prospects within 5 miles of Highway 1. You can search for information within specified areas using the Geographic Search/Queries feature. For example, *MapInfo* will retrieve data on an object, such as a line or point, or within a shape you create, such as an ellipse or a polygon.

Another *MapInfo* addition lets you display information on 18 kinds of map projections, including Mercator, Albers, Lambert, Roberson, equidistant, and state plane.

This new version of *MapInfo* is much better at generating presentations, with features that let you position, arrange, and resize maps, tables, charts, text, clip art, and the like. You also get more than 100 line styles and fill patterns, and you can create custom symbols and color them from a palette of 16 million shades. And not only does *MapInfo* now support *Windows 3.1* TrueType fonts, it also lets you rotate text labels to follow streets and other angles. —*Bruce Kinnaird*



MapInfo 2.0 adds new layout tools, lets you rotate text to follow angles, and includes a feature to define buffers.

IN BRIEF

MapInfo 2.0

WINDOWS A powerful Windows-based analytical tool offers novel ways to view data base information.

MapInfo Corp.
200 Broadway
Troy, NY 12180
518/274-6000,
518/274-6066 (fax)
Reader service no. 709

EnforceBase: Integrity for Your Data Base

Your business can't survive without integrity—at least your data base can't. If some hapless user accidentally changes an ID number or deletes a record to which others are related, the whole stack of cards can come tumbling down. SQL-based servers have all sorts of integrity checks built in, but *dBASE*-compatible DBF files don't. That's why Extended Systems created *EnforceBase*, a program that lets you know if your *dBASE* integrity has been violated.

You use the program's menu-driven interface to create a data dictionary—a set of rules that defines how your data relates and what changes people are allowed to make. You can tell *EnforceBase* which fields must be unique, set ranges that data must fall into, and specify which fields can't be changed without orphaning records in related files.

Despite its name, *EnforceBase* doesn't so much enforce these rules as tell you when they've been violated, giving you a report of errors that you can correct before disaster ensues. You can even set up *EnforceBase* to delete records that break particular rules. The program lists for $395. You'll need 1MB of available disk space to install it.

—*Lincoln Spector*

IN BRIEF

EnforceBase 1.1

Almost any program can write to a dBASE file; but this one tells you if someone's written the wrong thing.

Extended Systems
6123 N. Meeker Ave.
Boise, ID 83704
406/587-7575,
406/587-9170 (fax)
Reader service no. 710

Automatic Job Descriptions

Writing job descriptions is one of the most important yet frustrating activities that managers face. *DescriptionsWrite Now* aims to ease the process and improve the results.

Developed by KnowledgePoint, this DOS product has a very *Windows*-like interface (right down to the button bar), from which users navigate a library of 2400 job descriptions based on federal government definitions.

You customize these existing descriptions so you can tailor the qualifications, duties, or other aspects to meet your corporate or department standards. The program includes a question-and-answer routine that helps the manager define supervisory responsibilities, job qualifications, physical demands, and work environment. By prompting managers with questions concerning the last two issues, *DescriptionsWrite Now* promises to help employers comply with the Americans With Disabilities Act, which requires businesses with more than 25 employees to define clearly which jobs can be performed only by employees without disabilities.

The $149 package targets managers and human resource professionals looking for a tool to help them get the job description job done.

—*Jeffrey Gordon Angus*

IN BRIEF

DescriptionsWrite Now

A program that helps managers write and customize job descriptions.

KnowledgePoint
1311 Clegg St.
Petaluma, CA 94954-1191
800/727-1133,
707/762-0333
Reader service no. 711

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So try it! You'll be able to move and manage volumes, directories and files faster and with less effort than any other product. You can also create, extract and view ZIP archive files. And only XTree lets you view files from over 50 applications without running or even installing the application that created them. Open and manage as many windows as you want simultaneously. And we have added a new feature—XTree Link. This file transfer option allows you to seamlessly copy, view, move and manage your files between a PC and a laptop.

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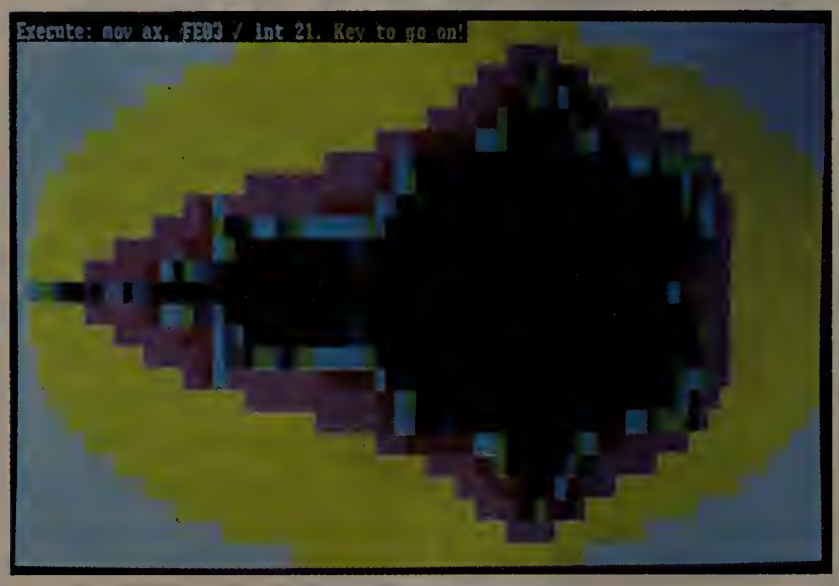
Circle 237 on reader service card

More Protection Against Stealth and Other Viruses



NoVi 1.1, Untouchable 1.1, and Vaccine 5.0 are three antivirus crusaders that combat the new stealth viruses, such as the Tequila Virus (above), that elude ordinary virus scans.

Although the Michelangelo virus scare last spring was blown way out of proportion, computer viruses continue to be a threat. Ever more ingenious ones threaten to invade networks, and some have even developed a cloaking capability.

Fortunately, antivirus programmers are working hard to keep pace. Certus's *NoVi 1.1*, Fifth Generation Systems' *Untouchable 1.1*, and the Davidsohn Group's *Vaccine 5.0* upgrade existing antivirus programs to deal with the most recent virus developments and mutations.

On installation, *NoVi 1.1* checks and cleans your hard disk, and checks and repairs any damage to the memory, partition table, boot sector, and operating system. The program also employs a TSR virus monitor, which you can load high with DOS 5.0. According to Certus, *NoVi 1.1* uses no checksums. Certus promises protection against all viruses, known and unknown, with no updates required. List prices vary from $129 for a single user to $61 per user for a 500-node site license.

Stealth viruses, insidious new members of the viral gang, infect files and remain undetected by reporting the original file date and size when scanned. Fifth Generation's *Untouchable 1.1* promises to expose stealth viruses with its own covert scans. Further, the program adds the capability to scan files compressed by archival software, such as PKZip. *Untouchable 1.1* now offers protection against 1000 known viruses and promises improved protection against the new self-mutating viruses that can elude older scanning procedures. The single-user *Untouchable* is available for $99; a LAN starter kit with a supervisor package and 10-node licenses is $695.

Vaccine 5.0 from the Davidsohn Group is an upgrade of a program previously available mainly to banking and financial clients. The Davidsohn Group touts its product's capability to intercept stealth viruses by taking a special CRC (checksum) of all programs on a hard disk and storing them in a quick-access data base. *Vaccine 5.0*'s TSR guards the system by checking programs before execution, automatically scanning floppies, blocking viral I/O calls, and logging all viruslike activities. *Vaccine 5.0* also lets you reconstruct virus-damaged programs and add new virus fingerprints to your virus data base. Prices for *Vaccine 5.0* start at $129, with corporate and quantity discounts available. —*Rex Farrance*

IN BRIEF

NoVi 1.1, Untouchable 1.1, Vaccine 5.0

New antivirus upgrades from Certus, Fifth Generation Systems, and the Davidsohn Group are enhanced to tame the latest viruses.

Certus Int'l Inc.
6896 W. Snowville Rd.
Brecksville, OH 44141
800/729-6684,
216/546-1500
Reader service no. 712

Fifth Generation Systems
10049 N. Reiger Rd.
Baton Rouge, LA 70809
800/225-2775,
504/291-7221
Reader service no. 713

The Davidsohn Group
20 Exchange Pl.
New York, NY 10005
800/999-6031,
212/432-4100
Reader service no. 714

Fast Windows Printing for a Song

Windows 3.1 has made printing faster, but it hasn't made it fast. If you've grown tired of singing "Someday My Prints Will Come," Zenographics' *SuperPrint 2.2* can have you humming a happier tune.

This $149 utility augments *Windows 3.1*'s 14 scalable TrueType outlines with 21 PostScript equivalents for fast on-the-fly screen and printer fonts. What makes *SuperPrint* unique is its capability to boost print speeds for a variety of popular font formats, including TrueType, Bitstream's Fontware and Speedo, Adobe Type 1, Nimbus Q, and Agfa Intellifonts. *SuperPrint* converts scalable fonts to compressed soft fonts for faster printing on LaserJets—claiming speeds up to four times faster than *Adobe Type Manager*'s on long documents.

But *SuperPrint*'s capabilities don't stop with fonts. It includes a SuperQueue utility to replace *Windows'* stodgy Print Manager that rapidly spools and prints files in the background so you can get back to work faster. You can use SuperQueue to print batches of files and manage network print jobs.

Version 2.2's improved fax support lets owners of Intel's SatisFaxtion and other CAS-compatible fax boards transmit documents from inside their *Windows* apps with no loss of font or graphics quality. And graphics pros will appreciate *SuperPrint*'s superior bit-map controls. You can create a 24-bit color image from inside virtually any *Windows* application and fine-tune its lightness, contrast, and gamma levels.

SuperPrint supports a wide range of dot matrix, ink jet, and laser printers. A minimum 1MB of RAM is recommended for lasers; *Windows 3.0* or *3.1* is required. —*Daniel Tynan*

IN BRIEF

SuperPrint 2.2

WINDOWS SuperPrint ups Windows print speeds and gives you more control over fonts and graphics.

Zenographics, Inc.
4 Executive Cir.
Irvine, CA 92714
800/366-7494,
714/851-1314 (fax)
Reader service no. 715

The Monitors for Windows

The ViewSonic 7 was the original, "Big Screen for Windows" monitor. Here's what some editors said about it:

Byte (May 1992) "... The ViewSonic 7 gets our vote as the best overall monitor".

Windows Magazine (May 1992) "... The ViewSonic 7 is the best value in the test".

Infoworld (Sept 1991) "... The ViewSonic 7 captured the top spot in our tests".

Introducing the NEW 14" ViewSonic 5E and the 15" ViewSonic 6FS.

The best of both worlds ... ideal Windows monitors to fit the size and budget requirements of every customer.

Now you have a choice.

These three great non-interlaced monitors have a lot in common, including minimum 72Hz refresh rate at 1,024 x 768 resolution. That's flicker free. Plus they're multi-scanning and have a non-glare screen.

The 15" and 17" monitors feature a flat square screen along with digital controls for programmable screen adjustments. To help maintain a safer environment, both are MPR-II certified for low radiation.

For the monitor that's best for Windows, make it a ViewSonic — the monitor of choice. And you have a choice of three!

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Walnut, CA 91789
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FAX (714) 869-7958

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Circle 218 on reader service card

COMPACT 14" ViewSonic 5E

MID RANGE 15" ViewSonic 6FS

FULL SIZE 17" ViewSonic 7

UltraFax Ups the Windows Fax Ante

ZSoft's UltraFax leaps ahead in the fax software race with powerful image editing tools, OCR, and an aggressive price.

Use UltraFax's image-editing tools to write on received faxes. This $119 Windows fax program also includes OCR for when text editing is a must.

Once a market dominated by Delrina Technology's *WinFax Pro* and a handful of modest, no-frills utilities bundled with fax-modems, fax software has reached the big leagues—thanks in part to the explosion in fax-modem sales that has attracted an abundance of software vendors. With street prices ranging from under $100 to about $200, fax programs are targeted at the growing number of fax-modem users who want the advanced features, including OCR, image editing, and scanner support, not found in the bare-bones packages that typically come with inexpensive fax-modems.

ZSoft Corporation, a company that is best known for paint and graphics software, is entering the faxing fray with *UltraFax*, a powerful *Windows* fax program that includes a TSR module to receive faxes while in DOS. Priced at $119, *UltraFax* breaks new ground by offering many sophisticated features not found in fax programs that cost twice its price.

At first glance, *UltraFax*'s interface appears much like that of any other *Windows* fax program: A button bar gives you quick access to commonly used features like send, print, delete, and view. You can click on icons at the bottom of the screen to view or edit your in- and out-box faxes, choose a cover sheet, or select a name from your phone book.

But go beyond the basics, and the strengths of *UltraFax* really shine. ZSoft has used its imaging expertise to endow *UltraFax* with an assortment of tools for editing faxes—no OCR conversion necessary. You can highlight important paragraphs by drawing circles and rectangles around the text, or cross out offending sentences using the Line and Erase tools. You can add notes to faxes by typing text in the margins—plus you have access to all the *Windows* fonts. ZSoft has also conveniently placed all of the editing tools in a movable toolbox. Only the *Eclipse Fax* package from Eclipse Software offers a comparable collection of image-manipulation features.

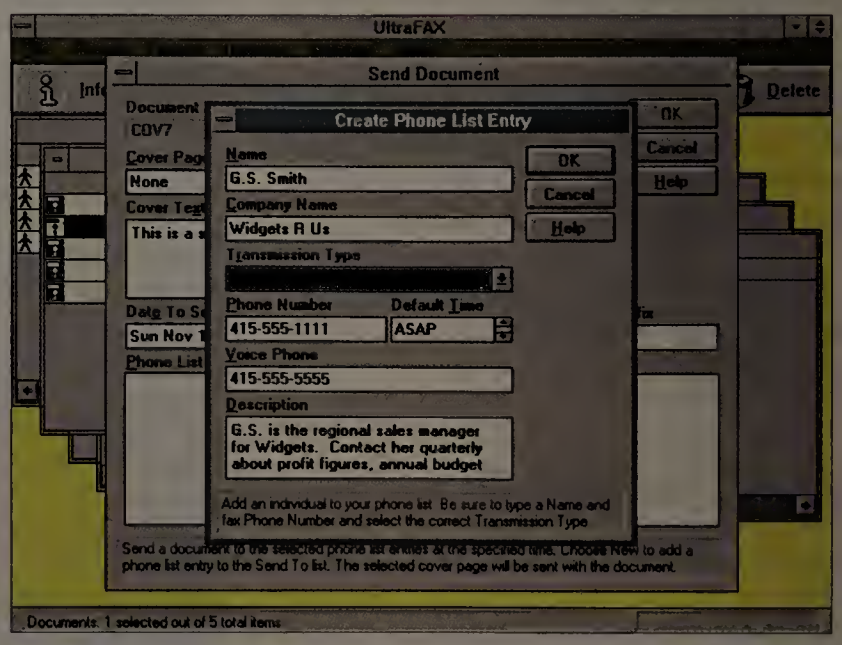
UltraFax lets you view faxes in partial-page, full-page, dual-page, or even multi-page "thumbnail" view. In thumbnail view, you can rearrange the pages by clicking and dragging them to different positions—swap pages 2 and 8, for instance.

ZSoft has added a unique file transfer feature to *UltraFax* that lets you send a binary file without first converting it to fax format. The program "wraps up" a binary file as a fax file, then sends it to another *UltraFax*-equipped fax-modem, where it's converted to its original state. While this feature's usefulness is limited, it does allow two *UltraFax* users to exchange editable word processing, spreadsheet, and graphics files without using a communications package. ZSoft plans to make its file transfer technology available to other fax software vendors, with the hope they'll add the feature to their packages.

And for times when you simply must have OCR to convert fax into text—to edit a contract or proposal, for example—ZSoft has added an OCR module developed by Ocron. Click on the OCR button to convert either a single fax page or an entire document, then forward the converted text to your clipboard or to a text file.

While *UltraFax* currently holds the price/performance edge in the fax software market, don't expect ZSoft's competitors to take this sitting down. The fax software market is just revving up—and users are in the driver's seat.

—Jeff Bertolucci



Use UltraFax to create individual or group phone lists. Edit a list entry by double-clicking the right mouse button.

IN BRIEF

UltraFax

WINDOWS Advanced fax software that offers OCR, image editing, and binary file transfers.

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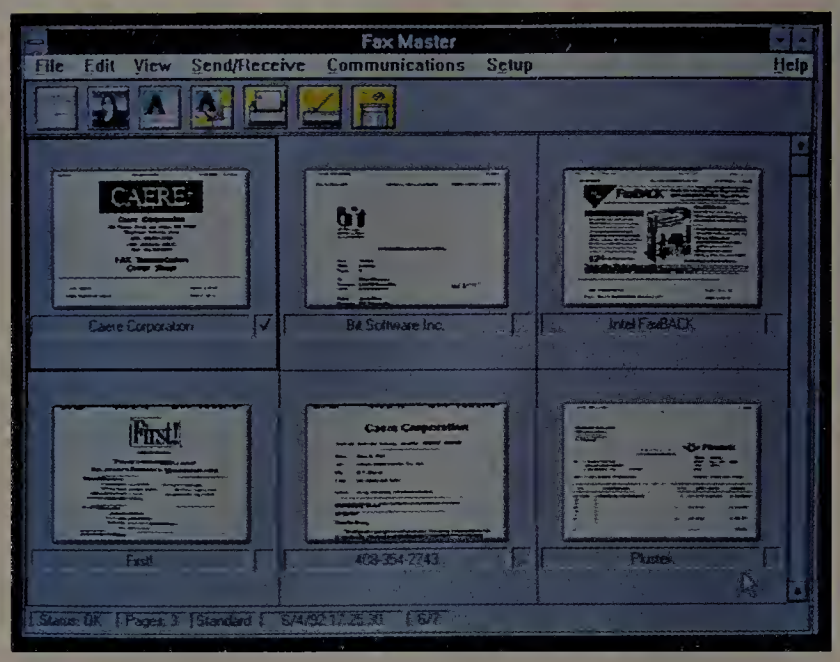
Fax-OCR Software Converts Incoming Faxes



FaxMaster, which uses Caere's improved OCR technology to convert incoming faxes into editable format, lets you send and receive faxes from within other Windows applications.

Sending faxes is getting easier, thanks to fax cards. But receiving a fax on your PC in an editable format can still present formidable problems. With most programs, you can't edit the fax because you receive it as an image. And those that offer OCR capabilities tend to commit so many errors in the conversion from image to ASCII, you can spend hours just correcting them.

Caere's *FaxMaster* boasts an OCR engine specially designed to recognize the types of characters sent over a phone line; the company claims this vastly reduces errors. The program automatically performs an OCR run on your incoming faxes and converts them to editable text within your *Windows* application. When you receive a fax, clicking on an electronic in-box lets you see the cover sheets of up to six new faxes.

After the OCR process, any misspelled words are automatically corrected and highlighted in the text editor, while any characters that are unrecognizable appear in red. If you come across a word in the ASCII document that you can't decipher, simply click on it, and then view the original fax image to see what the word was supposed to be. When you're finished with your proofing, just click on Export Text to export the fax into your existing application.

FaxMaster also lets you send a fax directly from within your application. You can select from a set of quick-dial numbers or schedule a fax to be sent at a specific time. To store the fax, you can compress it to ⅓ its original size and save it in a Viewer—where you can see thumbnail images of all the faxes you've received. You can use a built-in compression utility to shrink the size of the fax image, so it takes up less space on your hard disk.

FaxMaster requires a fax-modem or fax board. The program is compatible with Class 1, Class 2, CAS, and Sierra SendFax fax-modems. Priced at $249, FaxMaster may just be the ticket for converting faxes to editable documents.

—Bronwyn Fryer

IN BRIEF

FaxMaster

This all-in-one fax and OCR program lets you send and receive editable faxes from within your existing application.

Caere Corp.
100 Cooper Ct.
Los Gatos, CA 95030
800/648-3915,
408/395-7000
Reader service no. 717

Windata Offers High-Speed Wireless LAN

The knock against wireless networks that are based on spread-spectrum radio technology is that transmission speeds are too slow when compared to those of conventional, wired LANs.

That's changing, says Windata, a Northboro, Massachusetts–based start-up firm focusing on wireless communications. The company's flagship product, the FreePort Wireless LAN, offers data transfer rates as high as 5.7 Mbps—several times faster than those of competing spread-spectrum LANs, and more than half as fast as wired ethernet's maximum 10-Mbps transfer rate.

Designed for businesses that need LAN connectivity in hard-to-wire areas such as historic buildings or factory floors, FreePort is an ethernet-compatible network that transmits data up to 260 feet between a wireless hub (at a host LAN) and a wireless transceiver connected to a remote workstation.

FreePort supports up to 62 transceivers—or 256 active users, provided you buy an optional multiuser interface that lets eight PCs share one transceiver.

The FreePort wireless hub is the brains of this wireless network. It consists of a main chassis connected to a conventional LAN, and a freestanding wireless antenna that provides 360-degree horizontal coverage to the transceivers.

The hub acts as a traffic cop, synchronizing the transceivers to optimize data throughput. It receives packets of data from the transceivers, then resends them to other wireless nodes or on to the wired LAN. Similarly, each wireless transceiver consists of two units: the transceiver itself, and an interface box connected to your PC.

Since FreePort is ethernet compatible, you can run Banyan's VINES, Novell's NetWare, or any other ethernet-based LAN software. You can integrate a FreePort wireless node with an ethernet network to create a temporary or portable workstation, for example.

Network management options include Windata's *SeePort* user interface ($1950) and the *SeePort* wireless management agent ($445). Costs for FreePort itself vary from $345 to $1000 per node, depending on the number of wireless users.

—Jeff Bertolucci

IN BRIEF

FreePort Wireless LAN

An ethernet-compatible wireless network with data transfer speeds that rival those of wired LANs.

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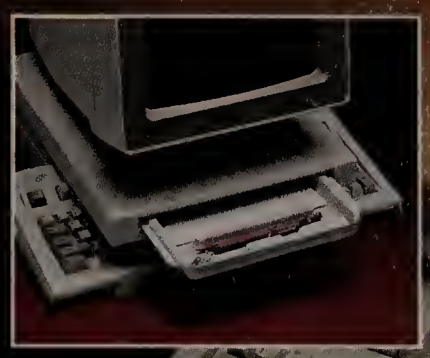

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Fax-Modems for Under $100

Modem prices continue their downward spiral. These days you'll find fax-modems going for under $100—with both communications and fax software thrown in to sweeten the deal.

The Complete PC is now shipping its Complete Modem, a $99 half-size internal board that provides 2400-bps data and 9600-bps fax transmission speeds. The package includes *BitCom*—a data communications package for transferring files and logging on to bulletin boards and dial-up services such as America Online and CompuServe.

The Complete PC's $99 Complete Modem combines 2400-bps data and 9600-bps fax transmission at a low price. DOS communications and fax software utilities are included.

The Complete PC's DOS fax software lets you send faxes from within any DOS application. You simply "print" to the COM port your fax-modem is assigned to, and a pop-up text box guides you through the rest.

The Complete PC's fax software offers many features that you'll usually find in retail fax packages, including background send/receive operation, the capability to schedule faxes for a later time (when phone rates are cheaper), personalized cover sheets, and fax send/receive logs.

Another bargain bundle is the $99 BSR Fax/Modem from DAK Industries. Like the Complete Modem, the BSR unit is an internal half-size board that combines 2400-bps data and 9600-bps fax.

Software bundled with the BSR Fax/Modem includes *WinFax 2.0*, which lets you send and receive faxes while working in any *Windows* application. For DOS users, *Quick Link II* provides basic fax and data communications software in a simple, menu-driven package.

—Jeff Bertolucci

IN BRIEF

The Complete Modem, BSR Fax/Modem

Two $99 fax-modems that include bundled fax and communications software for a complete communications solution.

The Complete PC Inc.
1983 Concourse Dr.
San Jose, CA 95131
800/229-1753,
408/434-9682 (fax)
Reoder service no. 719

DAK Industries, Inc.
8200 Remmet Ave.
Canoga Park, CA 91304
800/325-0800,
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Small-Budget LANs From Moses and Protec

While DOS-based peer-to-peer networks like *NetWare Lite* and *Lantastic* have received most of the limelight for bringing E-mail plus file and peripherals sharing to small businesses and work groups, they're not the only game in town. Penny-pinchers might want to check out two low-cost alternatives from Moses Computers and Protec Microsystems.

Moses Computers' *MosesAll* is a $99-per-node LAN that includes DOS-based networking software, a proprietary network adapter card, and a 25-foot standard telephone cable. One caveat: Since *MosesAll* doesn't use an industry-standard adapter card (like ethernet or ARCnet), you won't be able to connect to a non-Moses LAN, including any networks that are running Novell NetWare.

Aimed at the entry-level buyer, *MosesAll* networks up to eight PCs. Its *MosesNOS 3.0* TSR software requires 26K on each system. Although it lacks a built-in E-mail module, *MosesNOS* will work with any LAN-based E-mail package that supports the SMB protocol, including *Da Vinci*, according to Moses Computers.

An even simpler (and cheaper) solution, *Bytenet* from Protec Microsystems is a "zero slot" LAN that links PCs via their serial ports using standard null modem cables. Though saddled with a slow 57-Kbps transfer rate, *Bytenet* is suitable for simple file and printer sharing.

Bytenet's menu-driven software includes an E-mail "chat" utility that lets you send seven-line messages to other users. Simplicity is the key to *Bytenet*, says Protec. To print or send a file to another PC, for example, hit a hot key, up pops the *Bytenet* interface, and you choose the appropriate command from the menu. Hit <Escape>, and you're back in your DOS application. The company says it's working on *Windows* software, which it hopes to have available this fall.

Bytenet's optional lock mode provides security by denying other users access to your hard drive. Even in unlock mode, you can lock specific directories from prying eyes. Also, you can use a floppy drive on another system—useful for loading software that's on a 3½-inch disk if your PC has only a 5¼-inch drive.

Priced at $195 for four users and $295 for eight, *Bytenet* offers the networking basics to businesses operating on a tight budget.

—Jeff Bertolucci

IN BRIEF

MosesAll, Bytenet

Two low-cost peer-to-peer LANs that offer simple networking functions.

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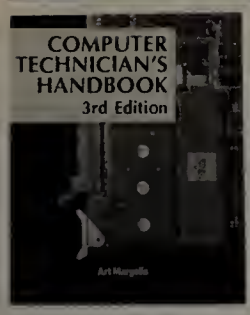

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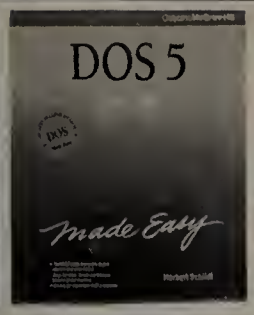

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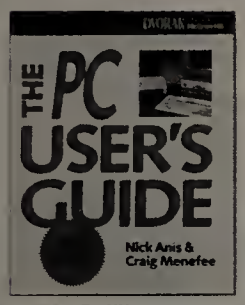

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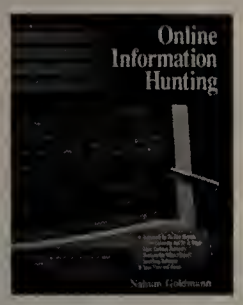

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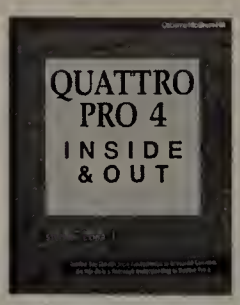

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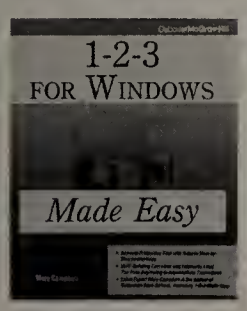

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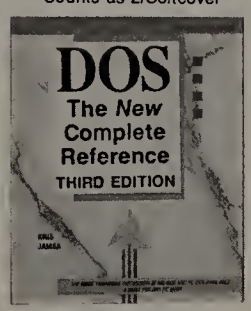

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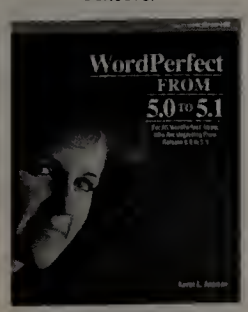

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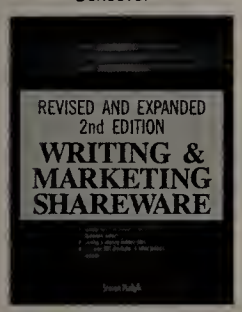

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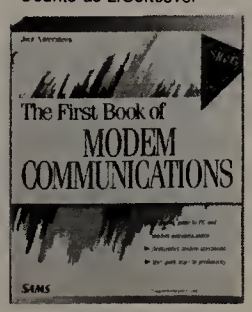

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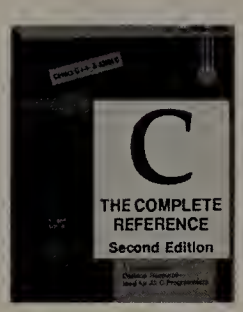

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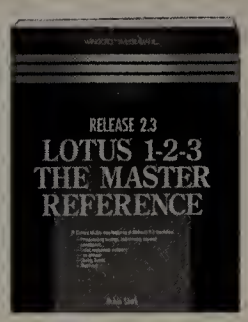

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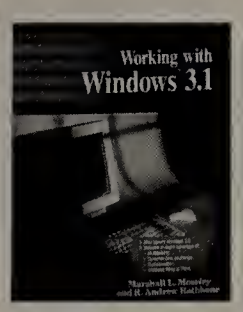

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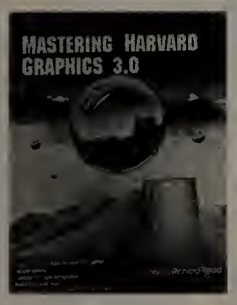

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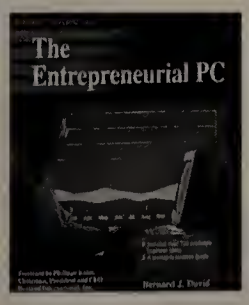

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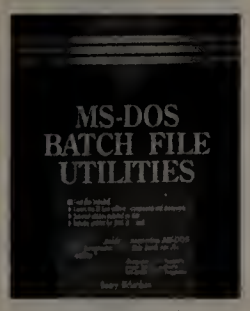

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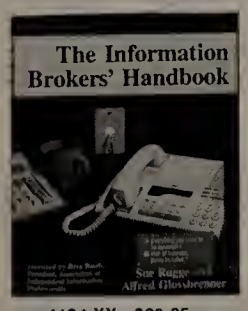

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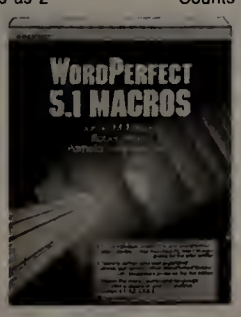

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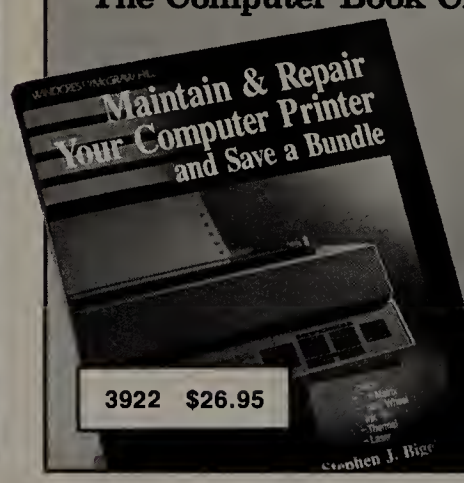

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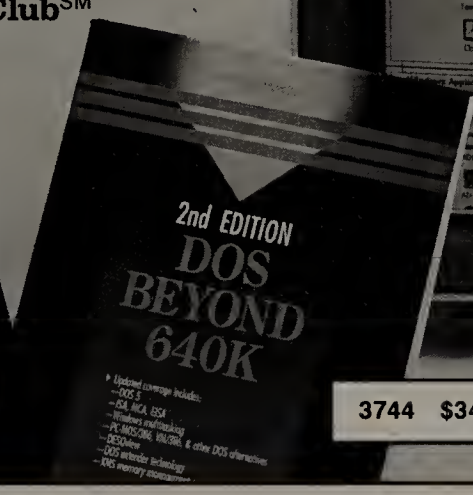

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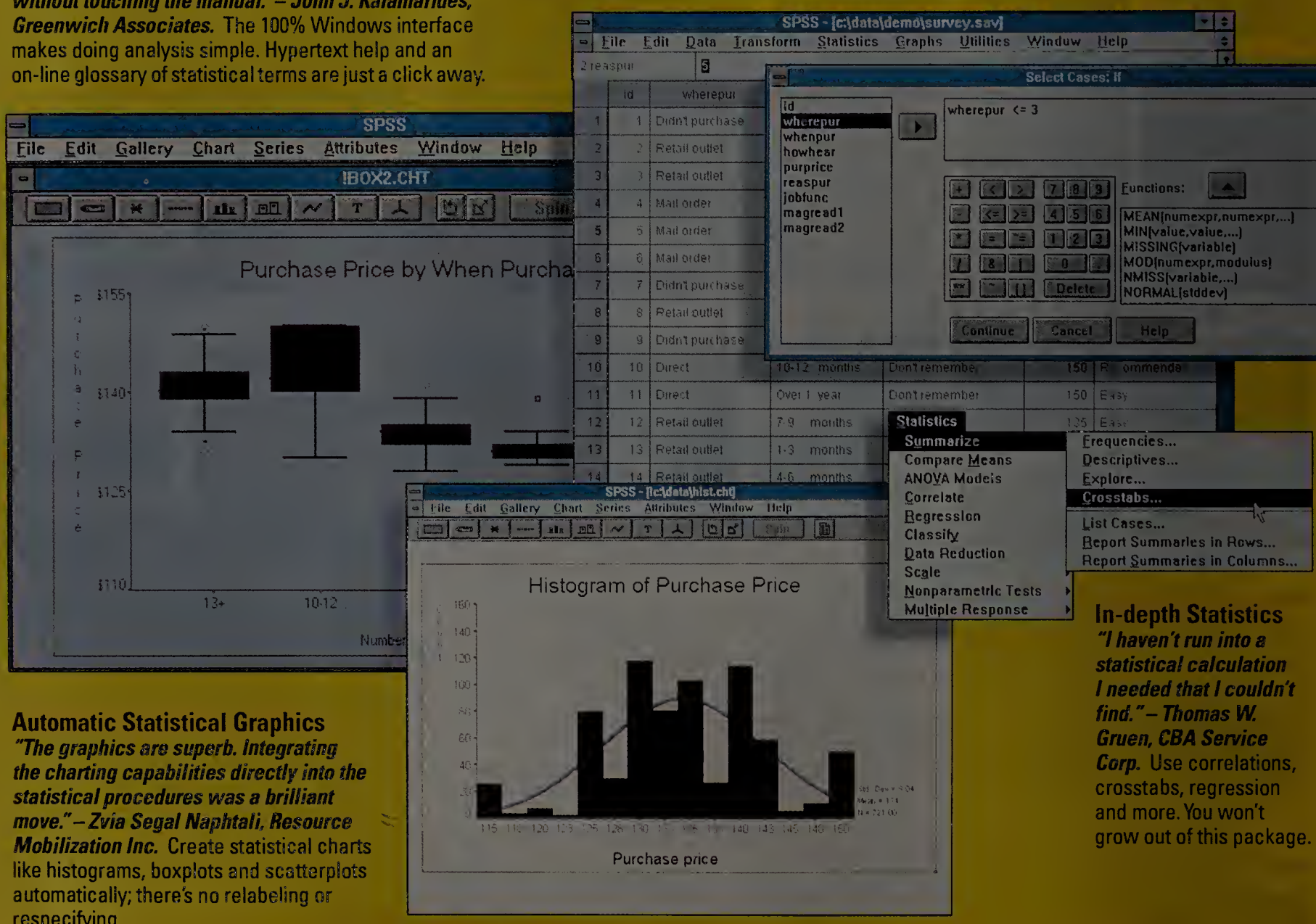

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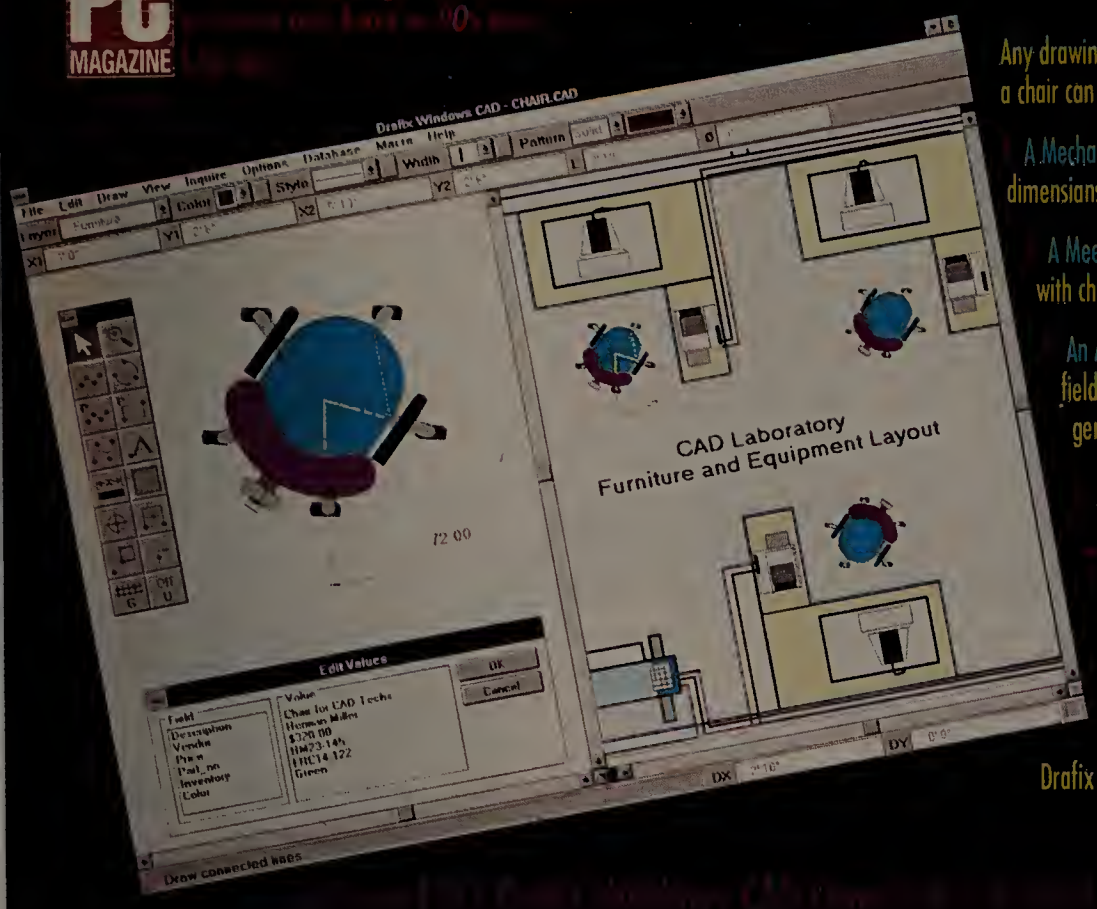

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Tandy 4800 HD, 4860 HD

The Tandy 4800 HD and 4860 HD are fast and faster versions of a diminutive notebook that Tandy has been making for years. The 4800 HD is powered by a 20-MHz 486SX processor, while the 4860 HD's 33-MHz 486DX processor puts it among the fastest notes on the market. Both have the standard 8.7-by-11-inch footprint but are only 1.65 inches tall and weigh just under 6 pounds. Preinstalled with DOS 5.0 and *Windows*, both come packed with 4MB of memory expandable to 20MB, a single 1.44MB floppy, and a fast 60MB hard drive. Each model's VGA adapter can drive its 10-inch-diagonal LCD and an external monitor simultaneously, and their nickel-cadmium batteries run for 3 hours between recharges. The Tandy 4800 HD retails for $2999, while the Tandy 4860 HD is $3499. Tandy/Radio Shack; contact your local Radio Shack store or dealer.

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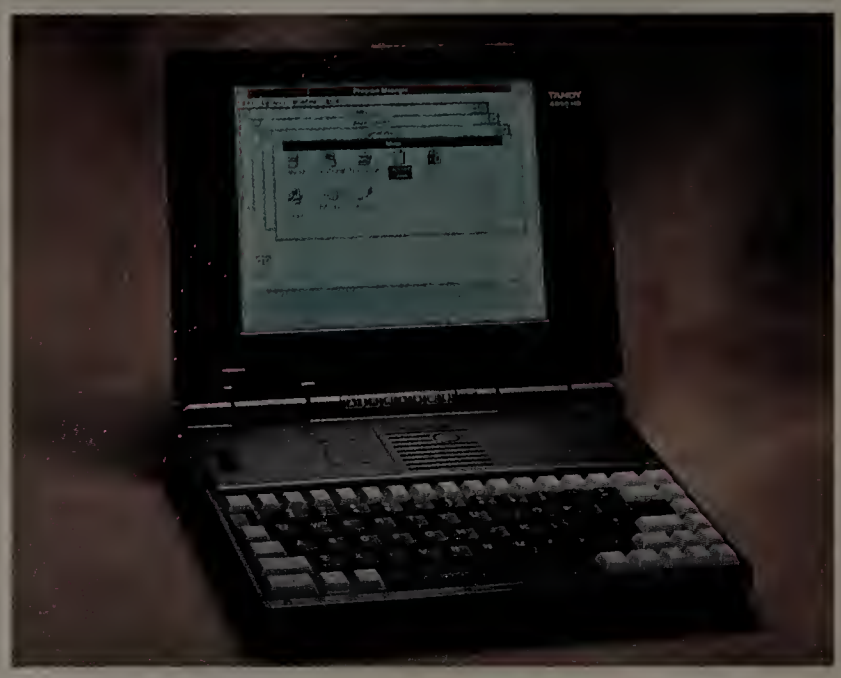

The Tandy 4860 HD's 33-MHz processor places it among the fastest notebooks available. It comes with 4MB of memory, preinstalled DOS and Windows, and it weighs just under 6 pounds.

PFS:WindowWorks 2.0

WINDOWS Spinnaker's upgraded integrated package gives you more bang for your buck with a smooth new user interface, OLE support, and a more versatile data base. Along with an array of pull-down menus and dialog boxes, each *WindowWorks* module sports a customizable Quick Button Palette that lets you place icons for the functions you use most—such as cut, paste, and save—in a window on screen for quick access. You can link and embed charts and graphs in your word processor from any OLE-compatible program, such as *Excel* and *1-2-3 for Windows*. The revamped data base lets you sort, view, and print records without generating a report. *PFS:WindowWorks 2.0* lists for $149. Upgrades cost $59. Spinnaker Software Corp., 201 Broadway, Cambridge, MA 02139; 617/494-1200, 617/494-1219 (fax).

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PowerSearch 1.1

You know that file you want is sitting somewhere on your hard disk, but you're a little fuzzy as to its name, creation date, and contents—and you're not much of a speller either. Version 1.1 of Horizons Technology's *PowerSearch* can deal with fuzziness, including ill-formed scanned characters. It uses a fuzzy-logic algorithm that identifies all precise or close matches of a given text string in any or all subdirectories on your hard drive, regardless of file type. Choose your subdirectories and use Boolean parameters (AND, OR, NOT) and a proximity function (for instance, to retrieve any mention of *Smith* within so many words of *Jones*) to cast as wide or narrow a net as you wish. *PowerSearch*'s sliding scale of fuzziness lets you choose just how close a match you want to the specified text string—for example, just *Smith*, or *Smith* and *Smythe*, or *Smith* and *Smythe* and *Blythe*. A DOS-based TSR, *PowerSearch* lets you search from within other applications and then paste the text you find into them. It retails for $99 for a single user and $495 for a six-user LAN pack. Horizons Technology, Inc., 3990 Ruffin Rd., San Diego, CA 92123-1826; 619/292-8320, 619/565-1175 (fax).

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Borland Languages

WINDOWS To keep up with the new demands *Windows 3.1* has placed on developers, Borland is shipping new versions of *Borland C++*, *Borland C++ & Application Frameworks*, *Turbo C++ for Windows*, and *Turbo Pascal for Windows*. All four products feature improved documentation; support for OLE, multimedia, and TrueType; and the capability to use color to differentiate parts of syntax. In addition, *Borland C++* offers integrated resource compilation and a utility to help you figure out what's causing program crashes. *Turbo Pascal* has improved its user interface and now comes with Borland's own *Resource Workshop*. *Borland C++* lists for $495 by itself and $749 with *Application Frameworks*; *Turbo C++* and *Pascal for Windows* list for $149.95 each. Several upgrade options are available. Borland Int'l, 1800 Green Hills Rd., P.O. Box 660001, Scotts Valley, CA 95067-0001; 800/331-0877, 408/438-8400.

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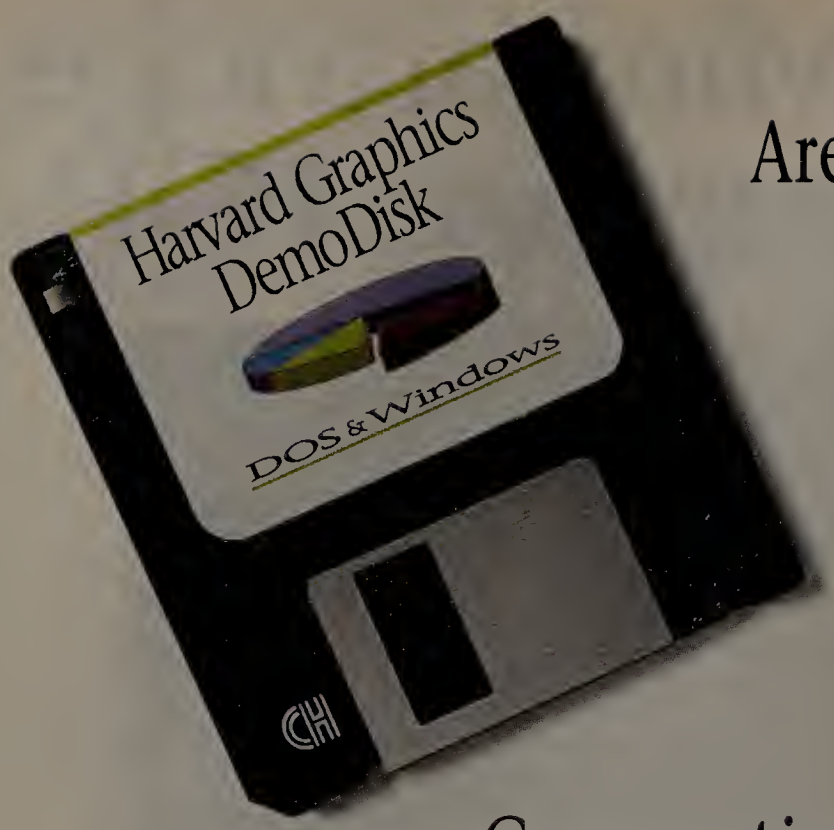

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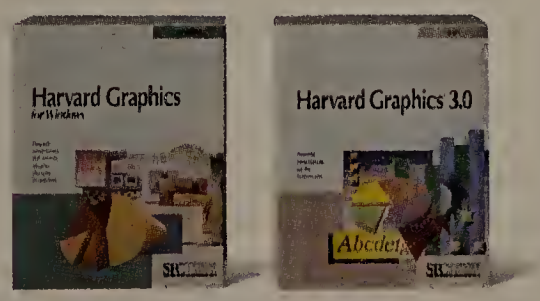

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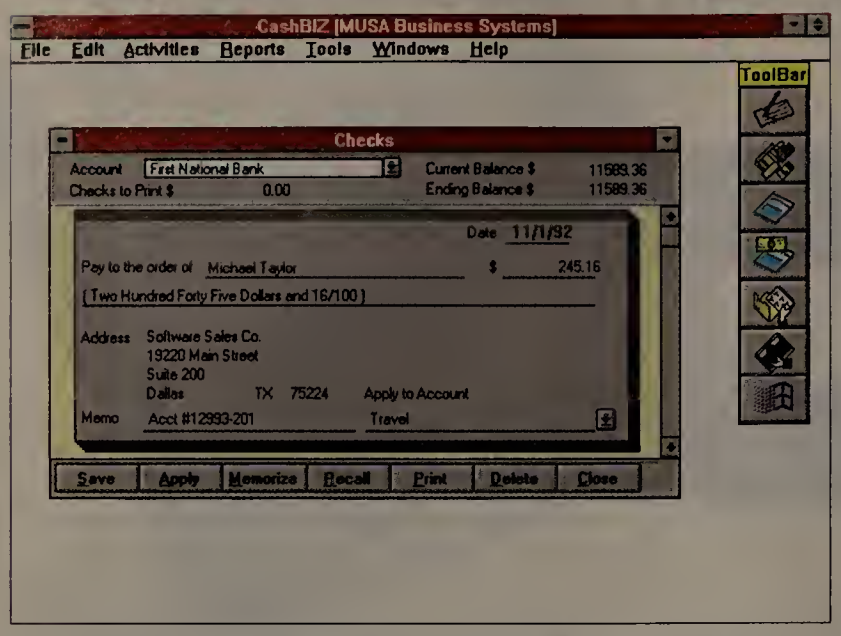

You can use CashBiz for Windows, an entry-level accounting package, to write your checks electronically.

poration is extending even further into the realm of mail-enabled applications. *MailMan 2.0* features an improved user interface and support for Dynamic Data Exchange links to other *Windows* applications. If you receive a message that's external to the mail system, you can store it in a folder in a DOS directory and access it via *MailMan*. The product also comes with a standard set of forms, including a routing list, a phone message slip, and a travel authorization form, all of which you can route. (An upcoming release of *MailMan* will let you create, manage, and route other forms.) You can select, sort, and filter incoming messages and use the integrated spelling checker to check messages. If you use a laptop or notebook, *Personal MailMan* gives you all the functions of *MailMan* while you're off line. You can create, manage, organize, and store messages for sending; once you're connected to the LAN, away they go. *MailMan 2.0* is priced at $495 for 10 users, $1495 for 50 users, and $2495 for unlimited users per server; *Personal MailMan* is $149. Reach Software Corp., 872 Hermosa Dr., Sunnyvale, CA 94086; 800/624-5356, 408/733-8685.

Reader service no. 726

Bookshelf for Windows 1992

WINDOWS If you've already plunged into the wonderful world of CD ROM, *Microsoft Bookshelf for Windows 1992 Edition* is a great resource. It includes a completely updated almanac, a thesaurus, an atlas, an encyclopedia, a dictionary, a quotation reference, and 500 new illustrations and photographs. You can now access multimedia capabilities from within *Bookshelf;* if you click on the name of a country, for example, you can hear it pronounced, regardless of the book you're using. Best of all, you can get a version of *Bookshelf 1992* that's integrated with *Word for Windows,* so you can cut and paste information from the encyclopedia into your *Word* document. With *Bookshelf and Word for Windows,* you get the complete *Word for Windows* user guide thrown in. *Bookshelf 1992* is a lot of package for $195; upgrades are $49.95. *Bookshelf and Word for Windows* retails for $595, but *Word for Windows 2.0* users pay only $99. Microsoft Corp., One Microsoft Way, Redmond, WA 98052-6399; 800/426-9400, 206/882-8080.

Reader service no. 728

CashBiz for Windows

WINDOWS M-USA Business Systems, the developer of *Pacioli 2000,* has just introduced *CashBiz for Windows,* an entry-level accounting program for home and cash-based businesses. This single-entry accounting package includes a designated chart of accounts for home use as well as accounts receivable and payroll features. It imports *Quicken* files and, in an attempt to entice *Quicken* customers, uses leftover *Quicken* checks. The program offers features generally found in personal information managers, including an address book, a notepad, and a calculator. *CashBiz for Windows* retails for $49.95. Technical support is free for the first 30 days, then $50 per year. The program requires 512K of RAM, a hard disk, DOS 2.1 or later, and *Windows 3.0* or later. M-USA Business Systems, Inc., 15806 Midway Rd., Dallas, TX 75244; 800/933-6872, 214/386-6100.

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Web 3.0

This major upgrade of Webcorp's DOS peer-to-peer network operating system now consists of six modules that load into RAM above 640K, leaving more conventional memory available for applications and data. *Web 3.0* features full Novell NetWare support, and users can access NetWare servers directly from *Web 3.0* workstations without loading the NetWare client shell. *Web 3.0*'s enhanced security system includes a network password. Also, new management utilities provide authorized users with networkwide remote diagnostics and system information. Other improvements include faster data transfer rates between *Web 3.0* workstations, as well as improved printing speeds. *Web 3.0* costs $99 for a single user. A license for 10 users is $765, for 30 users $1495. Webcorp, 3000 Bridgeway, Sausalito, CA 94965; 415/331-1449, 415/331-0911 (fax).

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Complete Communicator Gold

The Complete PC has added a host of new features to its Complete Communicator, a combination data-fax-voice board that's marketed as an office communications tool for small businesses. The most noteworthy enhancement is support for the V.32bis protocol, which the company claims works in conjunction with V.42bis data compression to offer a theoretical data transfer rate of up to 38.4 Kbps (actual performance will likely be slower). Also new is support for Caller ID: The Complete Communicator software automatically displays the phone number of the calling party—you decide whether to answer. (You must first buy the Caller ID service from your regional phone company, which may not offer it.) The Complete Communicator Gold includes both DOS and *Windows* fax and communications software and costs $699. The Complete PC, 1983 Concourse Dr., San Jose, CA 95131; 408/434-0145, 408/434-1048 (fax).

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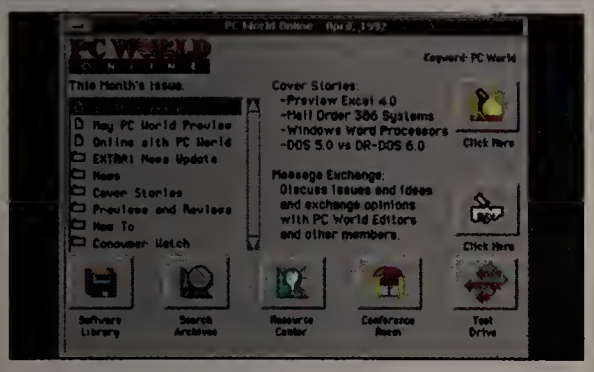

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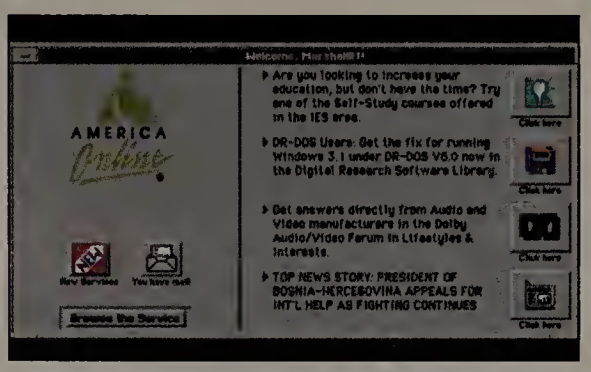

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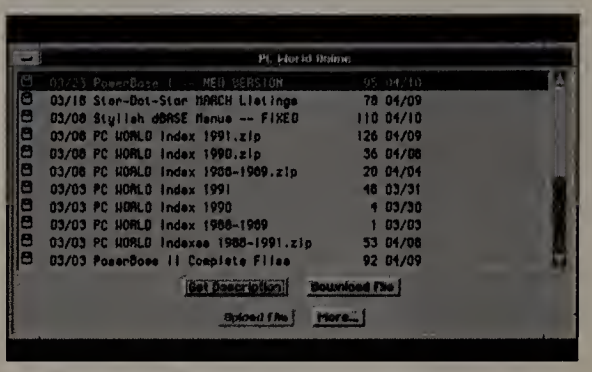

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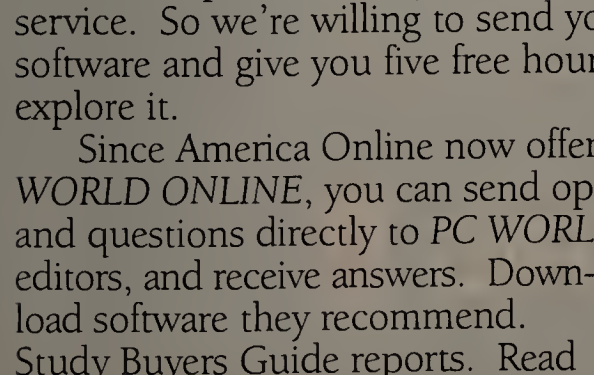

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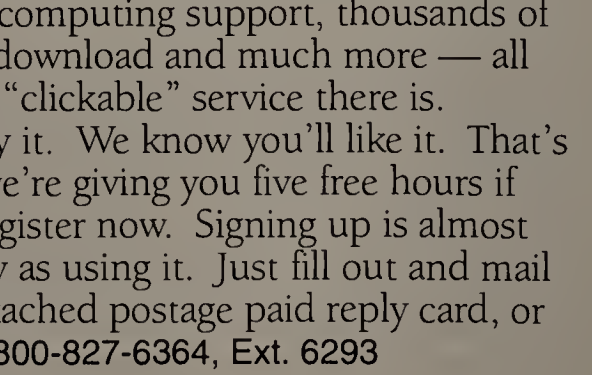

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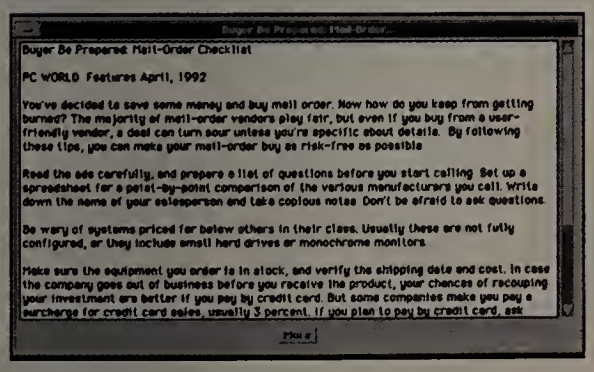

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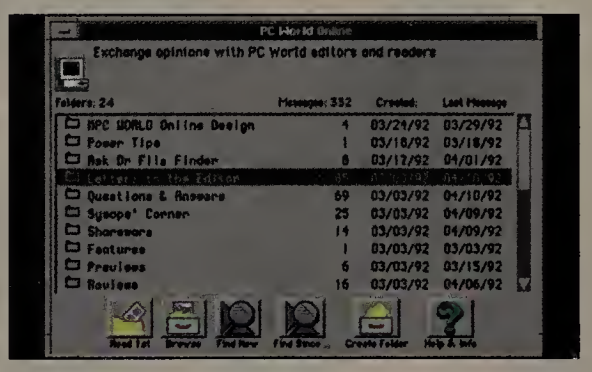

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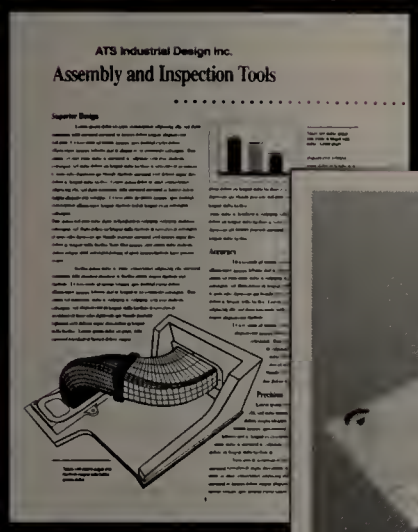

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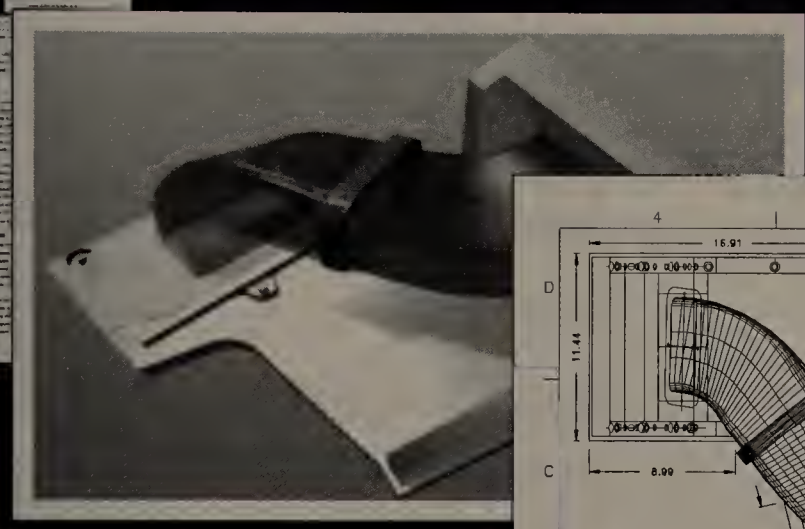
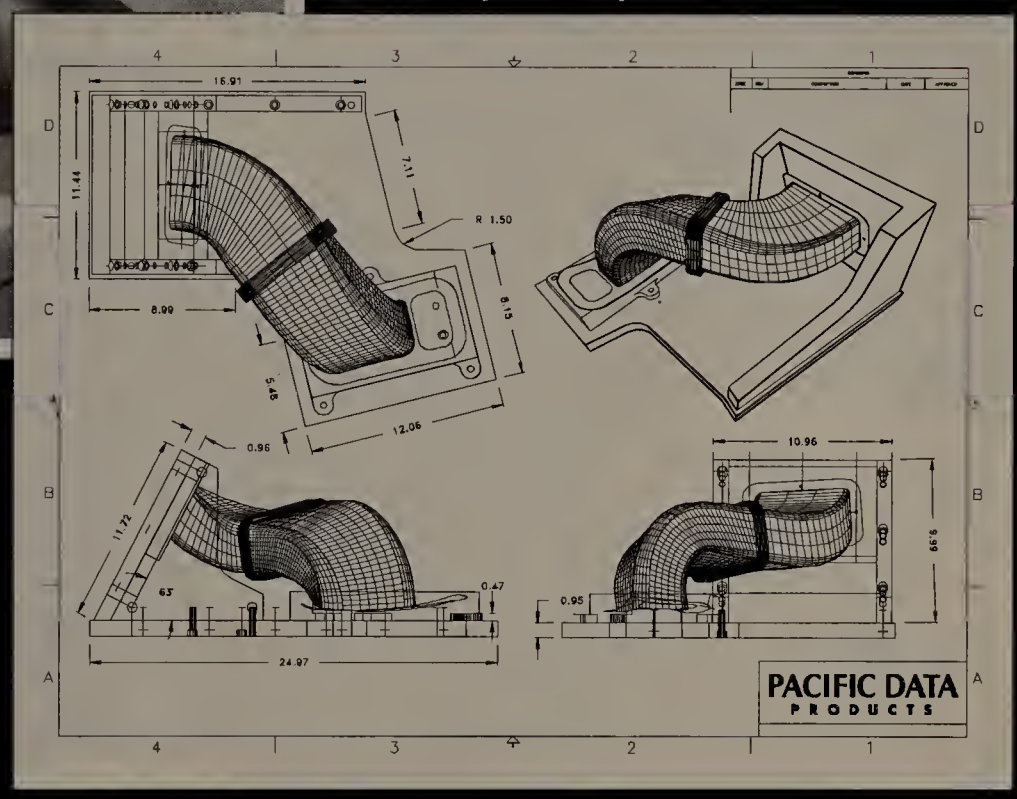


C-size (17" x 22")



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CADvance reads and writes *AutoCAD* DWG files without file translation or data loss. Moreover, this latest version also lets you bring in scanned images and handles vector and raster images in the same drawing. *CADvance for Windows 5.0* costs $1995. Registered users of *4.0* can upgrade for $295. Users of competing CAD programs can upgrade for $395. ISICAD, Inc., 1920 W. Corporate Way, P.O. Box 61022, Anaheim, CA 92803; 800/634-1223, 714/533-8642 (fax).

Reader service no. 731

Private Financial Network

If it's been possible to watch TV on computers for some time, why isn't everyone doing it? Perhaps because people work at computers and lounge in front of TVs. The Private Financial Network (PFN), Cable NBC's new financial and business video service, hopes to change this.

PFN is aimed at financial industry professionals, CEOs, and CFOs. The commercial-free programming includes in-depth coverage of financial and business news, roundtable discussions, complete speeches by industry notables, and some CNBC programming. You can watch it in a small corner of your computer monitor or pump it up to view it on a full screen.

PFN broadcasts Monday through Friday, 8 a.m. to 5 p.m. EST. To receive it on your PC, you need a video card, a 1.2-meter satellite dish, and a receiver/decoder. The service costs $850 a month for 20 computers at one site. Each additional terminal is $43 a month. PFN is sold through Video Programming Services, 215 Lexington Ave., New York, NY 10016; 212/340-7545.

Reader service no. 732

Port Blaster

WINDOWS Notebook users looking to make on-the-road presentations will appreciate this little unit. The *Windows 3.1*–compatible Port Blaster, from the makers of the popular Sound Blaster audio board, attaches to a laptop's parallel port to provide sound capability. It features 8-bit voice sampling and stereo playback; four-operator, 20-voice FM synthesis; a stereo mixer for audio sources; a built-in power amp and speaker; and a MIDI interface. A late summer release listed at $199, Port Blaster will certainly cost less on the street. Creative Labs, Inc., 1901 McCarthy Blvd., Milpitas, CA 95035; 800/998-5227, 408/428-6600, 408/428-6611 (fax).

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UltraBar

You want to stick with old reliable *1-2-3* for DOS, but you like all those handy SmartIcons you've seen in the *Windows* version. This add-in for *1-2-3 3.1* or *3.1+* provides up to 75 icons, arranged in palettes, to activate various *1-2-3* commands, macros, or add-in applications. UltraBar costs $69.95 and comes with 45 built-in icons—or you can build your own. Intex Solutions, Inc., 35 Highland Cir., Needham, MA 02194; 617/449-6222, 617/444-2318 (fax).

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LetterPress CD ROM 2.0

Image Club's motto is, "Whoever dies with the most fonts wins." By that definition, this massive CD ROM collection—635 PostScript and TrueType fonts—is for winners. An upgrade from version 1.6, *LetterPress CD ROM 2.0* features font-level PostScript

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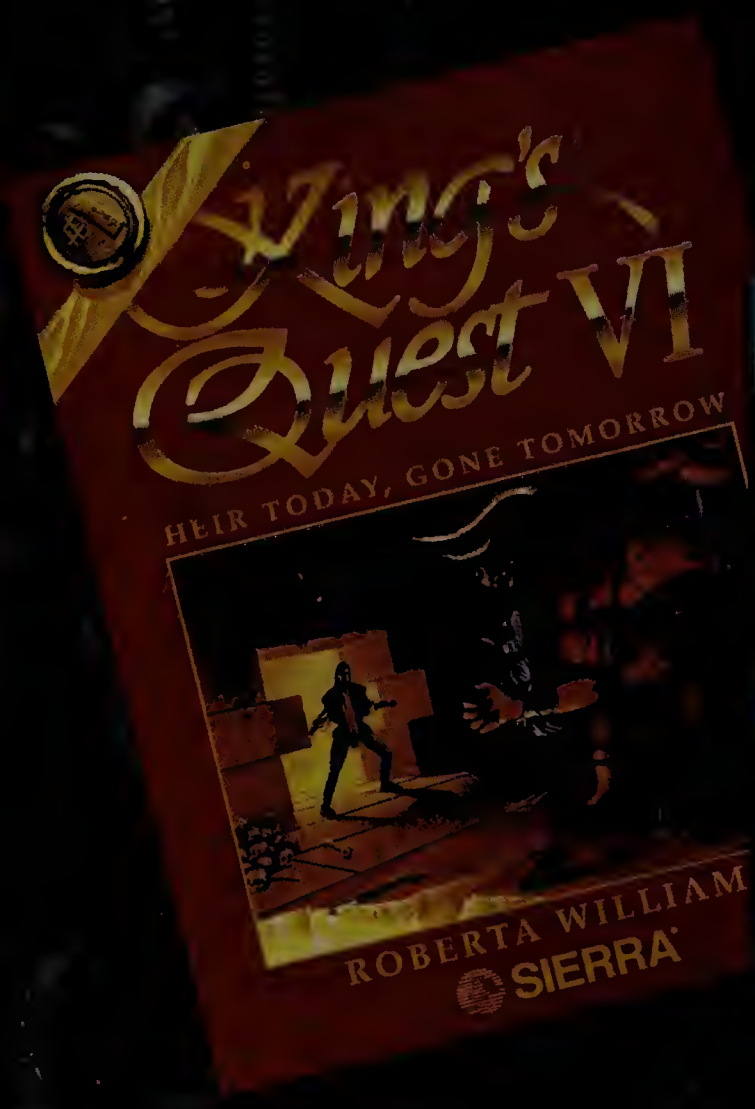
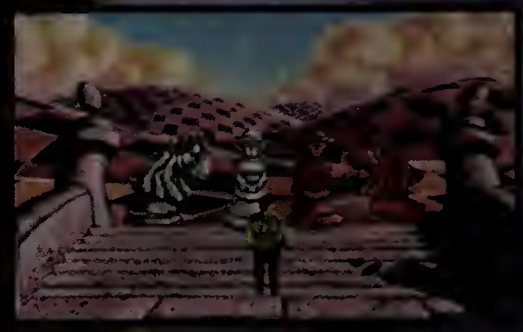
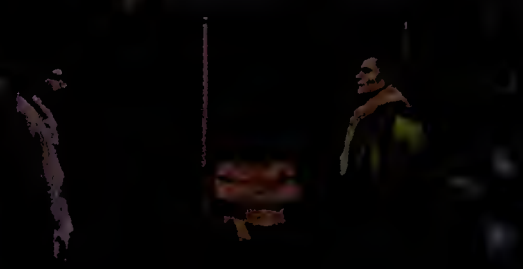


Can you guide Alexander through a series of mysterious islands?



Meet characters as curious as the countries they inhabit.

Explore the animated garden on the whimsical Isle of Wonder.



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Jon Honeyball, Windows Magazine UK, August, 1992

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Christina Wood, PC WORLD, July, 1992

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Mike Heck, INFOWORLD, July 13, 1992

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John Butler, Seybold Report on Desktop Publishing, July, 1992

"CorelDRAW is a phenomenal bargain"

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Aldus	Freehand	Persuasion	PhotoStyler	12	305	$1885
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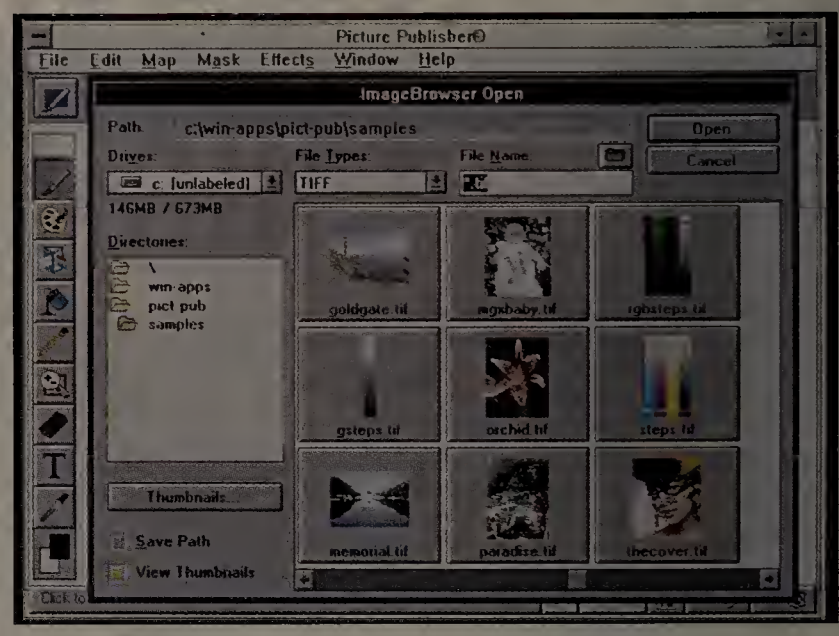

Picture Publisher 3.1 features advanced draw and paint tools, an image browser for thumbnail views, and support for JPEG compression, OLE, and Kodak Photo CD.

hinting as well as a font installer. It's a whopping $3999, but the upgrade is free from versions 1.5 or 1.6. Image Club Graphics, Inc., 1902 11th St. SE #5, Calgary, Alberta, T2G 3G2 Canada; 403/262-8008, 403/261-7013 (fax).

Reader service no. 734

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WINDOWS *Windows 3.1* raised our collective font consciousness. Suddenly every user knew the difference between Arial and Times New Roman and wanted even more font choices. The TrueType Font Library gives you 400 public domain and shareware TrueType fonts, comprising 200-plus standard text fonts, display typefaces, symbols, and other oddities.

The library also comes with a *Windows*-based data base and search program for finding fonts according to their commonly known names and vendors. The compressed files, which ship on twelve 3½-inch disks, run $59.50. EMS, Professional Shareware, 4505 Buckhurst Ct., Olney, MD 20832; 301/924-3594, 301/963-2708 (fax).

Reader service no. 735

Picture Publisher 3.1

WINDOWS Version 3.0, released earlier this year, won near-universal praise for its simple interface, facile 24-bit-color support, and powerful image-editing tools. This upgrade—which includes a slew of advanced draw and paint tools and an image browser that provides information and lets you view thumbnails of images—fills in the gaps.

Micrografx has also added support for JPEG compression, OLE, and TWAIN (a common interface—quickly emerging as the industry standard—that eases communications among scanners, other hardware, and software). Also new is support for the Kodak Photo CD, which lets users take a roll of 35mm film to a photo shop and have it transferred onto a Photo CD disk, viewable on a CD ROM XA drive. *Picture Publisher 3.1* costs $495, or $49.95 as an upgrade from *3.0*. Micrografx, 1303 Arapaho, Richardson, TX 75081; 800/733-3729, 214/234-1769, 214/234-2410 (fax).

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For more information about any product, contact the manufacturer or circle the number on the reader service card.

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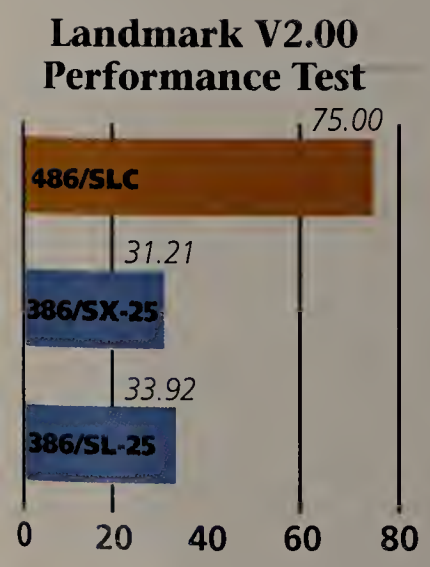

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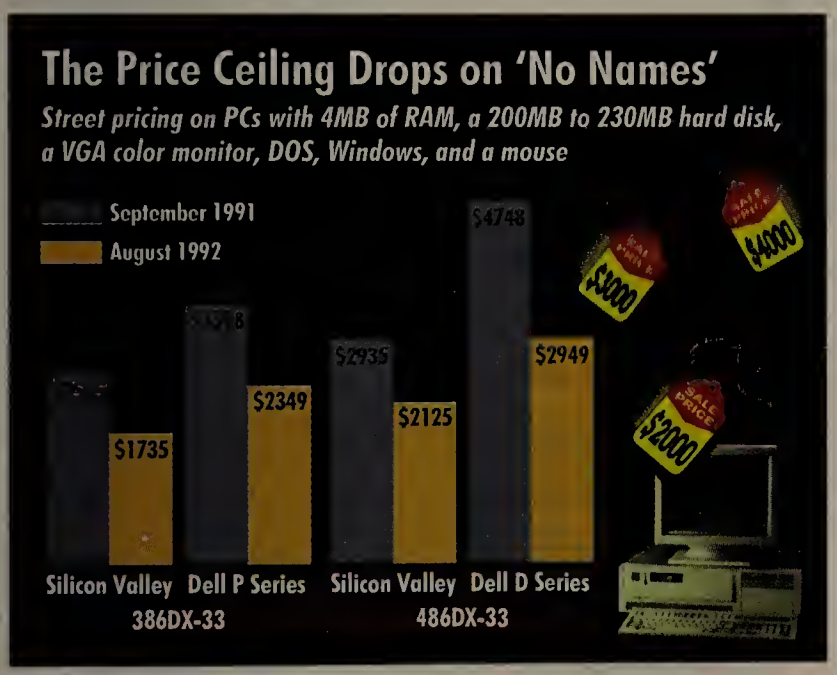
Edited by ERIC BENDER

Price War Starts to Take a Toll

But Buyers Can Expect PC Costs to Keep Dropping Anyway

For some players, the PC industry's wicked game of cutthroat pricing is over. Ever-shrinking profits are forcing them to fold their hand, refocusing on higher-margin peripherals or shutting down.

Hardest hit are the smaller companies that don't have the financial resources to survive a lengthy price war. For those that lack brand-name recognition, high-margin corporate accounts, or a diversified and innovative product line, the game looks more like Russian roulette. While today several hundred firms offer PCs, "expect that number to drop to well under 100—maybe even two dozen," predicts analyst Jack Karp of Meta Group in Westport, Connecticut.



"No-name" PC suppliers like Silicon Valley still offer big discounts over major players like Dell, but the savings margin is narrowing.

Good-Bye Garage Shops?

Giants such as Compaq and AST no longer forfeit the low-end market to small firms. This summer each introduced bargain lines, with prices for 386SX desktops starting at about $1000 and complete 486s going for under $2000. That's right where "the garage shops had their advantage," says Dennis Cox, AST's director of consumer products. But the price differential has slipped from thousands to a few hundred dollars.

When that happens, many buyers turn back to name brands. "It's not like a couple years ago, where if you had a quarterly price change, people were satisfied. Now they want new prices every month," says Rhonada Rudnick, domestic sales manager for Silicon Valley Computer, a small PC manufacturer in Mountain View, California. Silicon Valley Computer and its peers say that times are hard and that they are paying the rent on razor-thin margins. Some firms, such as Blue Dolphin Computers of Burlingame, California, quietly shut their doors this summer.

Larger firms aren't immune, either. Electronics giant Philips announced in April that it was discontinuing its Magnavox line of computers due to the "unfavorable market environment." Mass-market headliner Packard Bell withdrew its proposed initial public offering in May after unimpressive financial results. In July, Zeos International disclosed another quarterly loss (this one climbing to $11 million) and laid off more than 100 workers. In August, Everex Systems said it was running in the red and laid off 250 workers. Northgate Computer Systems' second-quarter losses are in: The company posted a loss of $10.2 million, and it's eliminating 80 jobs. Even vendors who are on a roll aren't piling up winnings—Compaq is currently running on an operating profit margin of only 2 percent.

In addition to staying lean and mean, survivors of this shakeout must find more profitable, less commodity-oriented niches such as network servers, says Genelle Trader, marketing vice president for Everex.

Prices Will Fall—For Now

While talk of price wars and an industry shakeout is grim news for vendors, so far it has brought mostly good news to buyers: cheaper PCs. Karp and other analysts expect prices to drop even further.

Among the factors: Intel's decision to postpone shipment of its P5 (a.k.a. 586) processor until early next year will likely lead to more price cutting on 486 systems, as Intel continues to chop prices to fend off a slew of competing chips. And prices on hard drives continue to fall as well—most strikingly for 170MB to 200MB models, which now may cost little more than $400. —*Jeff Bertolucci*

Vendors would prefer that PC pricing stay high enough to offer robust profits, but as a shakeout looms, the pricing trend continues to point down.

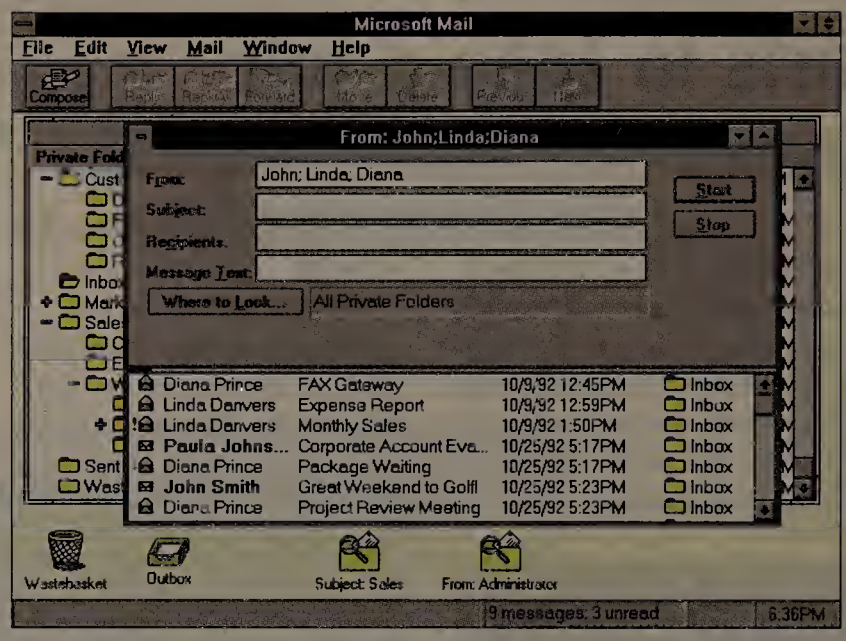
Microsoft Aims for Group Success

Software Giant Will Push "Mail-Enabled" Windows Applications

This is the decade of group software, and the major players in PC software are sweating bullets in efforts to enable teams of people to share documents, route forms, and distribute data between networked desktops.

Enter the biggest player of all: Microsoft, which has just begun to release a set of *mail-enabled* integrated packages, built on top of *Microsoft Mail 3.0* and designed to let users work together in electronic teams. The company has assigned no fewer than 300 technical staffers to its workgroup development staff.

The company is also building *Mail* into a version of *Windows*, tentatively called *Windows for Workgroups*, to be completed this fall. And Microsoft aims to make its *Windows*-based Mail Application Programming Interface (MAPI) the de facto choice for developers of mail-enabled applications that work across all mail systems—although Lotus is spearheading a coalition that backs a conflicting standard.



Mail for Windows is the centerpiece of Microsoft's huge effort to dominate the evolving market for group applications.

Starting on Schedule

Microsoft's first mail-enabled application is the *Schedule+* group scheduling package (see the preview in this issue). Beta users such as Karen Dicks, manager of information systems at BCM Engineering in Plymouth Meeting, Pennsylvania, offer kudos for the product. Dicks prefers *Schedule+* to her former *Windows*-based group scheduling package due to its hooks with *Mail* but would like see even tighter integration so she can send mail within each application.

Dicks will get her wish in all upcoming Microsoft packages, says Kathleen Schoenfelder, Microsoft product manager for *Windows* applications. "For example, you'll be able to set up a spreadsheet in *Excel* and route it to your boss automatically from within the program," says Schoenfelder. Next year, look for a forms-routing package, a bulletin board package, tracking and reporting tools, and perhaps even a data base–oriented "group memory" package.

Microsoft is betting that combining *Windows* with E-mail–based applications will gain it a stronger foothold in large organizations now running highly functional but clumsy messaging systems such as IBM's PROFS. By providing gateways between *Mail* and these systems, Microsoft plans to allow *Windows*, DOS, OS/2, and Macintosh users to communicate seamlessly with those who use terminals. So far, Digital Equipment, AT&T, Hewlett-Packard, Novell, and CompuServe have inked deals. "Microsoft has something for virtually anyone—multimedia, backbone networking, total office solutions, groupware, mail-enabled applications," says Eric Arnum, editor of *Electronic Mail and Microsystems* in Washington, D.C. "All it needs now is sales."

Rivals for Group Leadership

Lotus, which mail-enabled all its *Windows* offerings last year, will hold on to its E-mail leadership by incorporating ever more gateways into *cc:Mail* and ensuring that the product runs on all platforms, says Terry Rogers, vice president for communications products. Even more critically, this fall Lotus will beef up *Notes*, its tool kit for information-sharing network applications, by adding work-flow capabilities, text searching, and other enhancements. With its unique knack for making information available across wide area networks, "*Notes* goes well beyond what people are offering in the messaging field," says Rogers. Lotus also has enlisted considerable third-party support for *Notes*—something Microsoft has yet to achieve.

Around year-end, an update of *WordPerfect Office*—which already has integrated mail, calendar, and scheduling modules—will add a mail-enabled function. You'll be able to set up rules to filter mail and launch other applications from within the program. Meanwhile Borland is chugging away on an ambitious back-end workgroup engine called Object Exchange.

As these offerings arrive, the competition will be "so fierce that customers are in a good position to make demands," Arnum points out. "If yours is a medium to large-size company and you want the vendor to include a module that turns the lights on and off, go ahead and ask for it."

—Bronwyn Fryer

Working on the Work Group

Group application plans at major PC software suppliers

Company	Platform	Plans
Borland	none yet	Object Exchange work-group engine and applications, release date TBA
Lotus	cc:Mail	Adding versions (including Windows in fall), gateways, mail-enabled applications
	Lotus Notes	Major upgrade in fall, dozens more third-party products arriving
Microsoft	Microsoft Mail	Schedule+ now shipping; forms-routing, bulletin board, work-flow, and perhaps "group memory" packages in 1993
WordPerfect	WordPerfect Office	Major upgrade in December with rule-based functions, hooks to non-WordPerfect packages, and open application interface

The major software suppliers are laying the E-mail groundwork for a frantic round of competition in new group applications.

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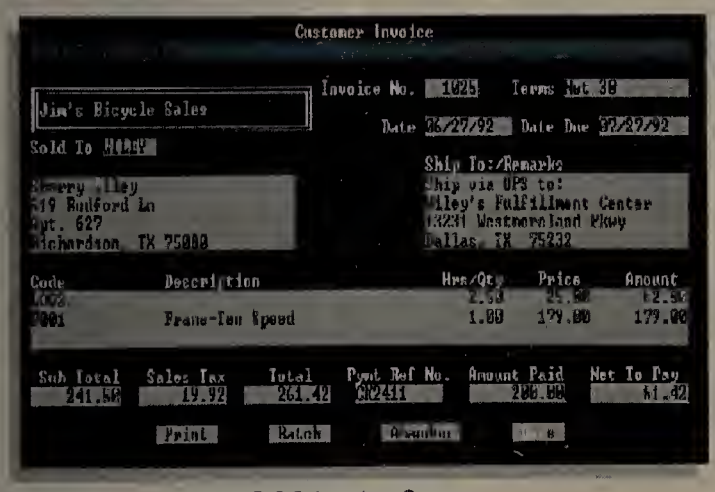
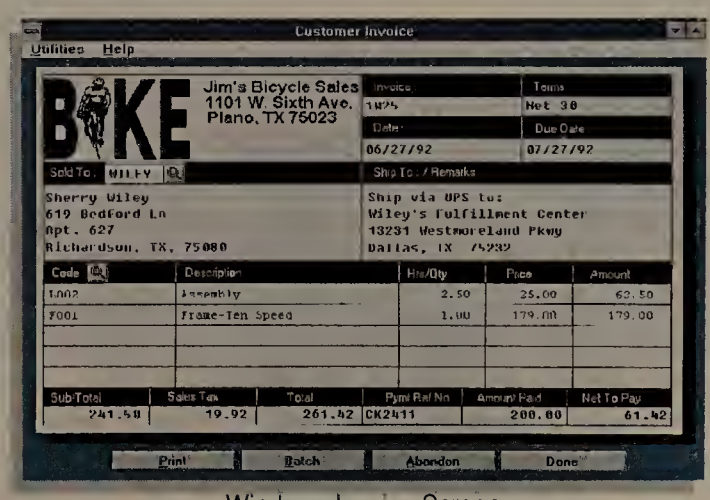


DOS Invoice Screen



Windows Invoice Screen

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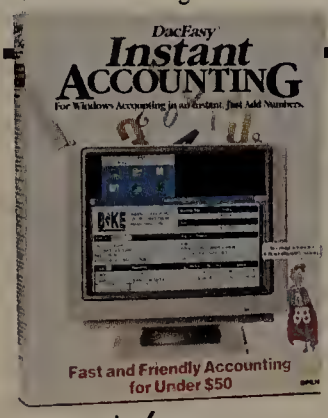

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IBM or compatible PCs, 512K RAM (1 MB with Windows), a hard disk drive, DOS 3.1 or later, Windows 3.0 or later (optional), monochrome, CGA, EGA and VGA monitors. Mouse optional. Windows is a trademark of Microsoft. DacEasy Instant Accounting is a trademark of DacEasy, Inc. © Copyright 1992. All rights reserved. DacEasy, Inc., 17950 Preston Rd., Suite 800, Dallas, TX 75252. Media Code: PCW

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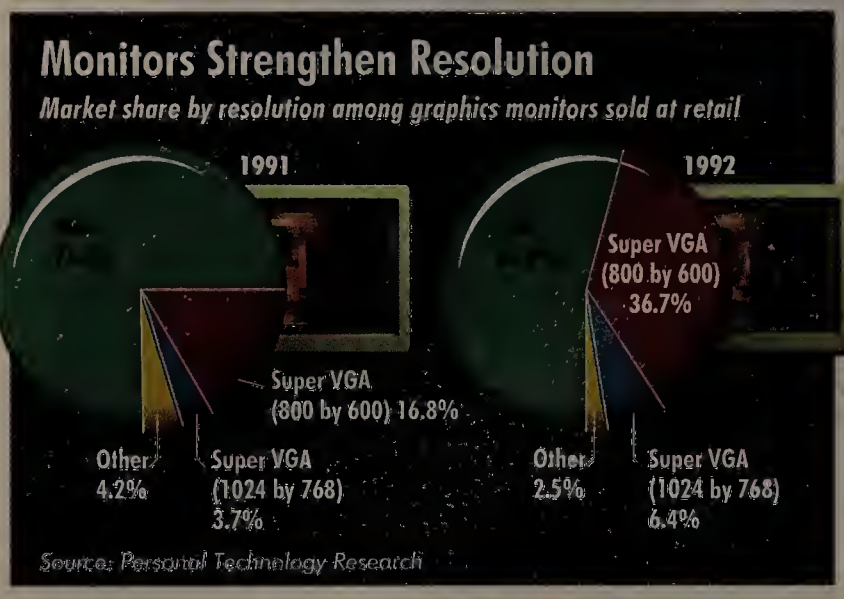
Graphics Options Proliferate Wildly

Inexpensive Hardware Vastly Accelerates Windows Performance



The majority of graphics displays sold are still standard VGA monitors, but higher-resolution monitors are coming on strong.

Fitting your PC with graphics hardware used to be easy: Every couple of years IBM set the standard, and you just followed suit.

Those days are long gone. Buy a PC today, and the salesperson will ask if you want a VGA or super-VGA controller, semi-intelligent VGA accelerator, programmable graphics coprocessor, or even a local-bus system.

Why all the options? While *Windows* packages and other graphics-oriented software are becoming ubiquitous, they bring a performance hit. Over half of a CPU's performance is soaked up displaying *Windows* text and graphics. Try to do complex graphics or CAD work in *Windows* on a PC with a dumb VGA controller, and you're in for a long wait. So vendors have been hard at work trying to boost screen performance without burying you in additional cost.

Beyond Vanilla VGA

A standard VGA or super-VGA board serves most users reasonably well. Prices on Taiwanese-made boards run under $100, and entry-level systems such as Compaq's ProLinea come with super-VGA capability at resolutions ranging up to 1024 by 768.

Windows warriors venturing into graphics-heavy applications should consider accelerated VGA boards from vendors such as ATI Technologies in Toronto and S3 of Santa Clara, California, or proprietary hardware like the QVision found in Compaq's Deskpro/M line. With prices dropping to a mere $250 to $300 on the street, these boards have become hot items.

True graphics hogs will want to take a look at graphics coprocessor boards, which sport powerful, programmable processors—the most popular of them being Texas Instruments' 340*xx* chips. Prices start as low as $200 but can run into the thousands.

Jumping On the Local Bus

But graphics coprocessors are in for some tough competition. There's an alternative way to boost screen response: You can sidestep the slow ISA or EISA bus altogether. With this approach, graphics controllers hook directly into the higher-bandwidth CPU bus via a local bus. This provides "a faster connection between the processor and the VGA chip, so you can get the data into the chip and onto the screen faster," explains Fred Dunn, vice president of Jon Peddie Associates in Oakland, California. (Local buses also speed access to hard drives and other high-speed peripherals.)

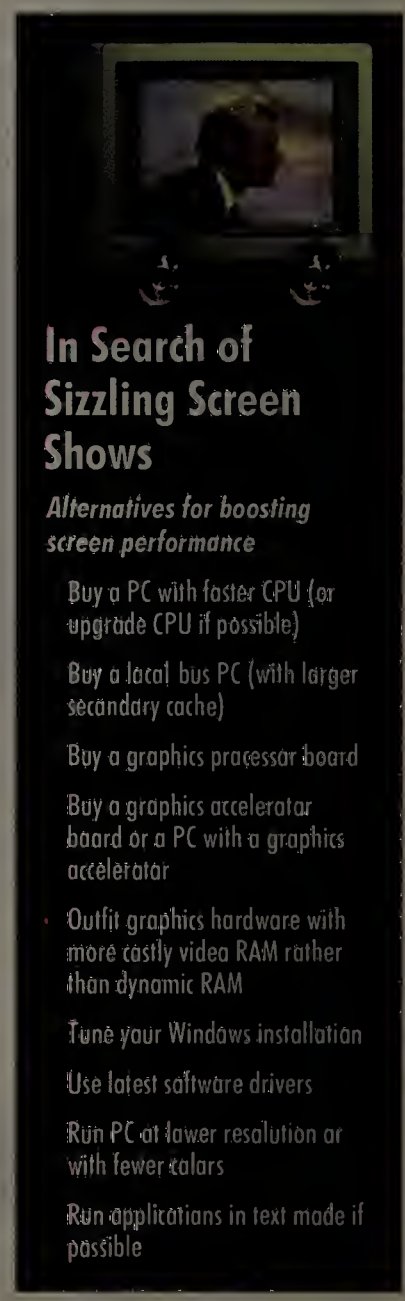
Two local-bus standards have surfaced. The VL-bus, proposed by the Video Electronics Standards Association (VESA), offers a single common interface to the CPU using currently available chips. Users just connect their graphics adapter to a new slot in front of the ISA or EISA slot. "The nice thing about the VESA VL-bus is that it's very inexpensive to implement," says Ron McCabe, product manager for Tseng Labs in Newtown, Pennsylvania. He estimates that eventually it will cost the user only about $100. PCs fitted with the VL-bus are capable of four to eight times the speed of a standard super-VGA PC. Over 50 manufacturers are working on VL-bus designs, and many products should arrive this fall.

Chip-making giant Intel has muddied the waters with an alternate local bus. Called Peripheral Component Interconnect (PCI), it is more complex than the VL-bus, and it is meant to provide more of a chip-level interface for future peripherals. "PCI is a motherboard local bus; VL is a plug-in–card local bus," explains Dunn. As a motherboard solution, PCI isn't a retail product; it also will not appear for at least a year.

Meanwhile, some vendors are moving ahead with their own designs. Dell's PowerLine 450DE/2 DGX taps a proprietary local-bus architecture to boost graphics performance up to ten times. Southern California Gas in Los Angeles bought the PowerLine to run engineering simulations. "Video performance is important to us because screen repainting is one of the more time-consuming tasks," explains Bob Holmes, computer technology research analyst.

Local-bus hardware is trickling down to the mainstream; both S3 and ATI already offer new chips with local-bus interfaces. "You'll see a lot of differentiation with local-bus technologies," adds McCabe. —*John H. Mayer*

John H. Mayer is a freelance writer based in Belmont, Massachusetts.



There's no shortage of ways to improve the performance of your PC's screen.

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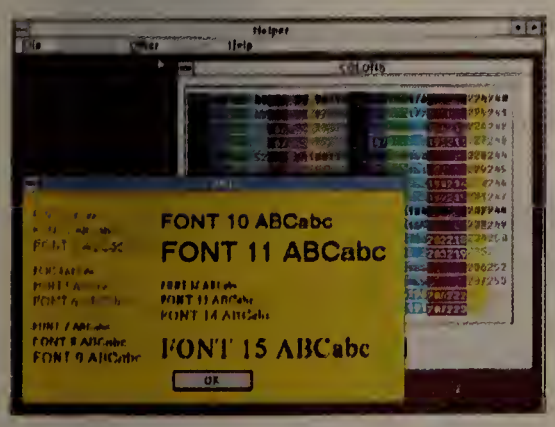

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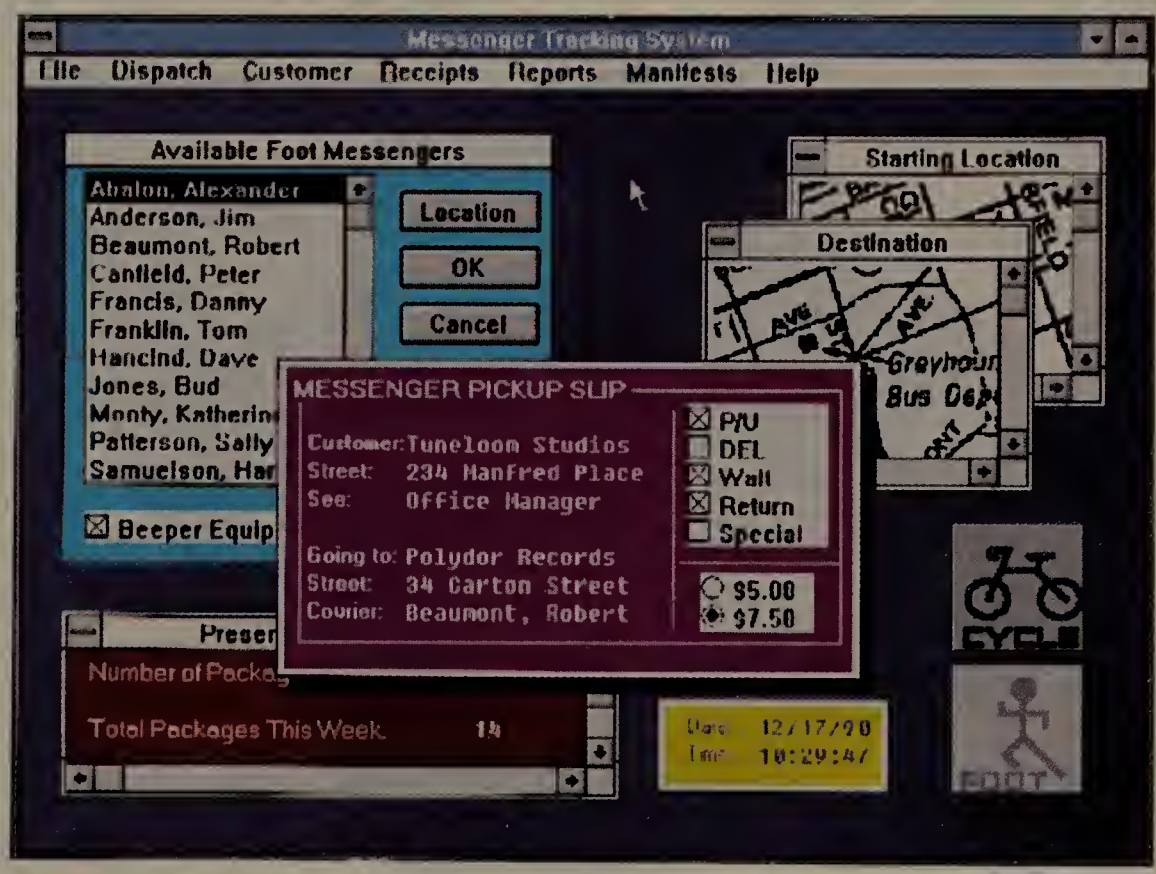

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FASTMICRO RAISES THE 486 STANDARD

Our Next Generation of 486 PCs

At FastMicro, we've been building PCs for over six years, in fact, we've been doing it since the day we went into business. So when we sat down to design our most powerful FastData PCs ever, we wanted them to stand apart from the crowd. We utilized the most advanced technology available and combined it with the features our customers asked for most and came out with a whole new line of 486 PCs that are as different from our previous products almost as much as they are from our competitors' boxes.

Our new desktop case has extra RF shielding, lots of drive bays (notice the seventh one under the power supply), dual cooling fans and a stylish pop-off front cover.

Advanced Case Design

Our new desktop case is uniquely engineered to provide the highest quality and maximum expandability in a space saving design. It has a total of seven drive bays to accommodate all of the storage options our customers tell us they want to be able to add in the future. It also has extra protection against electrical interference, unlike the weaker systems others sell.

The Most Processor Upgradability - All the Way to 100mhz!

We've designed our new systems to expand upon Intel's ambitious upgrade strategy. While some other systems have no upgrade path and others only let you upgrade from i486SX to i486SX or i486DX to i486DX (or DX/2), FastMicro's new systems can be upgraded to any 486 processor - 486SX or 486DX. So the 486SX you get today can be upgraded to a 486DX or DX/2 tomorrow. Imagine buying a FastData 486DX/33 now and upgrading it to a 100mhz DX/2 later - our systems are designed to do just that. You can go up to a 50mhz clock rate processor (100 mhz for clock doublers) and up to future upgrade CPUs.

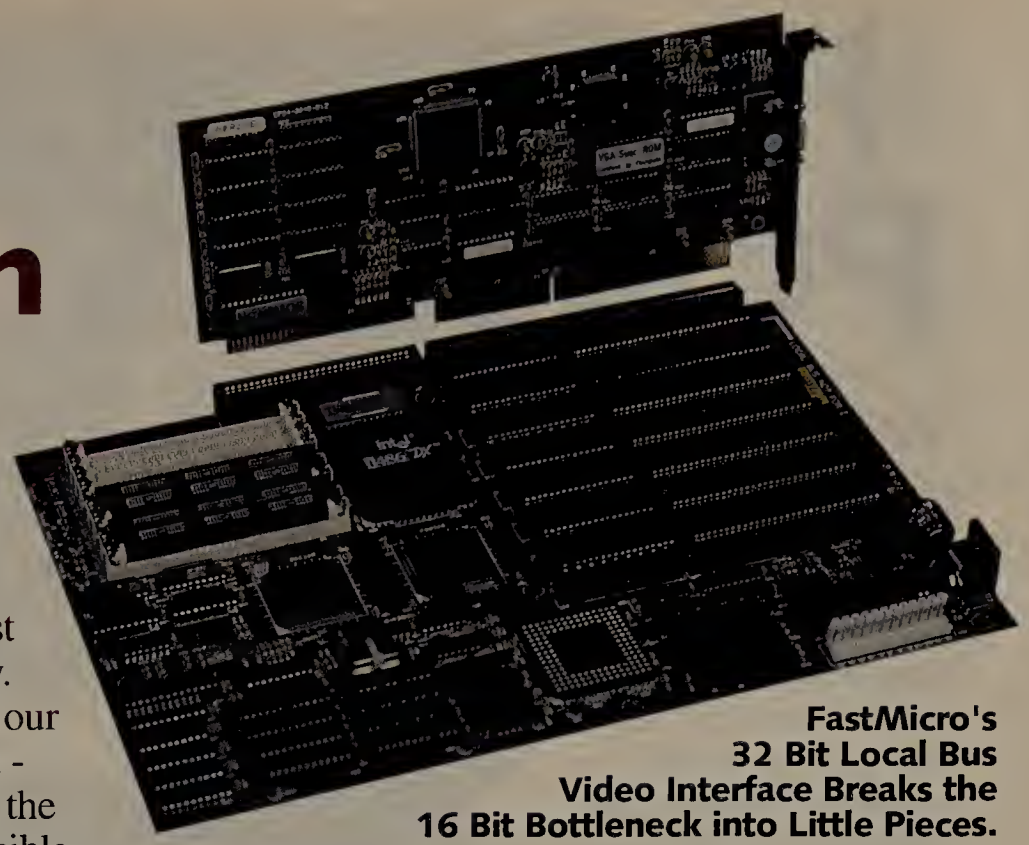
FastMicro protects your 486 investment.

Plus, unlike some other companies that make you purchase an expensive proprietary "CPU Module" or "Upgrade Card" not available anywhere else, all you have to do to upgrade your FastData 486 is to install a new processor, replace the clock crystal and change some system settings. That's it - no catches.

Extra Cooling Power

Intel's new clock doubler chips put out much more heat than its predecessors. The i486DX/2 66mhz even requires a heat sink. FastMicro's new desktop PCs come with a second temperature-activated fan to dissipate system damaging heat. Not all systems are alike - FastMicro's last longer!

Turbocharge Windows with Local Bus Video Power



FastMicro's 32 Bit Local Bus Video Interface Breaks the 16 Bit Bottleneck into Little Pieces.

FastMicro's new systems feature the highest performance video options on the market today. From our standard 1mb Super VGA adapter to our highest performance Windows accelerator card - every video option we offer consistently yields the highest possible performance at the lowest possible cost.

Today's Windows environment is very dependent on video speed for overall system performance. The i486 is a high speed 32 bit processor, it handles data in and out in 32 bit chunks at external processor speed (such as 33mhz). The problem is that the ISA bus found in normal systems is 16 bit and only runs at 8 mhz, thus video performance is severely crippled!

FastMicro removes the performance limit with its 32 bit high speed local bus. Plug the Local Bus Video Card into the special 32 Bit Slot and Windows flies!

BUYER'S CHECKLIST

	FastData 486's	Other 486SX's	Other 486DX's
486SX Overdrive Ugr.	X	X	
486DX Upgradable	X		?
486DX2 Upgradable	X		X
50/100mhz Upgradable	X		?
High Speed Video	X	?	?
7 Drive Bays	X		
Dual Cooling Fans	X		
GE On-Site Service	X		
Money Back Guarantee	X	X	X
7th Year in Business	X	?	?

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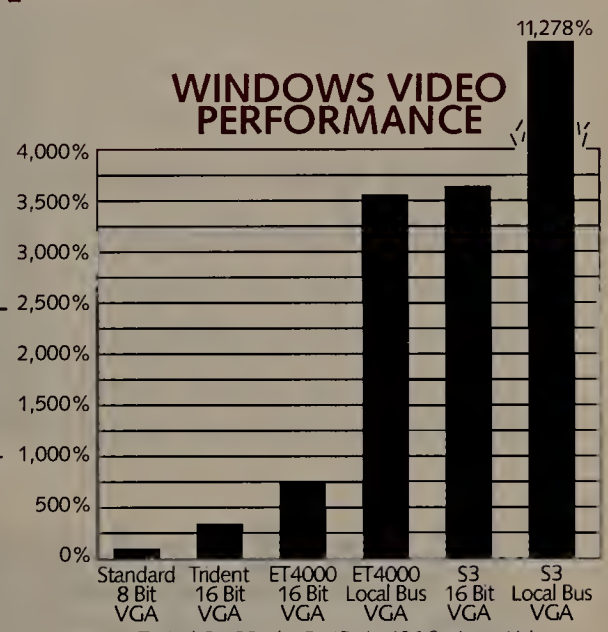

Tested On 33mhz FastData 486 Systems Using PC Magazine Windows Benchmark Tests

Some systems come standard with our Trident 1mb VGA card: it's 16 bit, runs Windows 3 times faster than standard 8 bit video cards and does up to 1024 x 768 at 256 colors . Other systems come standard with our PowerWin™ Hi-Color ISA card. It uses a Tseng Labs ET4000 Windows Accelerator Chip, it's more than twice as fast as the Trident card and it does a maximum of 32,768 colors. Our S3 NuclearWin™ Coprocessor ISA Video Card offloads the video processing from the CPU and, in turn, significantly multiplies performance. It's like having a second computer in your computer!

Choose one of our Local Bus 486 PCs and we'll include the Local Bus Version of our PowerWin Accelerator - it screams through Windows graphics. You can also upgrade to the Local Bus Version of the NuclearWin Card - it will run Windows up to 100 times faster than standard VGA Cards. Fasten your seat belts!

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Powerful 170 Mb IDE Drive.

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Why call one company to order your PC and another for everything else? FastMicro is the only leading system vendor that also advertises a full line of software, peripherals and more to complete your system and keep you abreast of all the latest technology products to maximize your computing productivity. Four times a year, we'll send you our informative catalog featuring over four hundred PC products at low FastMicro prices. It features everything from Windows software to books, accessories to networking, and printers to games.

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FastData Local Bus 486DX/33 $1799

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- **32 Bit Local Bus PowerWin™ Windows Accelerator Card with up to 16 Million Colors.**
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FastMicro backs up all FastData PCs with the most comprehensive service in the business. Seven day a week toll-free technical support is included for as long as you own your FastData PC. In the unlikely event a part should fail during the one year warranty, we'll express ship you the replacement part. If we still can't resolve the problem, we'll send GE on-site or replace the system at no charge.

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Bargains of the Month

The Gateway 25-MHz 486SX and the Dell Dimension NL25 were the most aggressively priced desktop and portable PCs in the July survey by International Data Corporation.

Best-Sellers

Leading PCs sold through computer stores and traditional dealer channels

1	Compaq LTE Lite/25	6	IBM PS/2 Model 40 SX
2	IBM PS/2 Model 35 SX	7	IBM PS/2 Model 70/20
3	IBM PS/2 Model 56 SLC	8	Compaq Deskpro 486/33M
4	IBM PS/2 Model 55 SX	9	Compaq Deskpro 386/25M
5	Compaq LTE Lite/20	10	IBM PS/2 Model 57 SLC

Compaq finally loosened IBM's iron grip on the top position among PCs sold through the dealer channel, according to Storeboard Channel Tracking's June survey.

Over the Counter

What you pay at retail stores for popular PCs

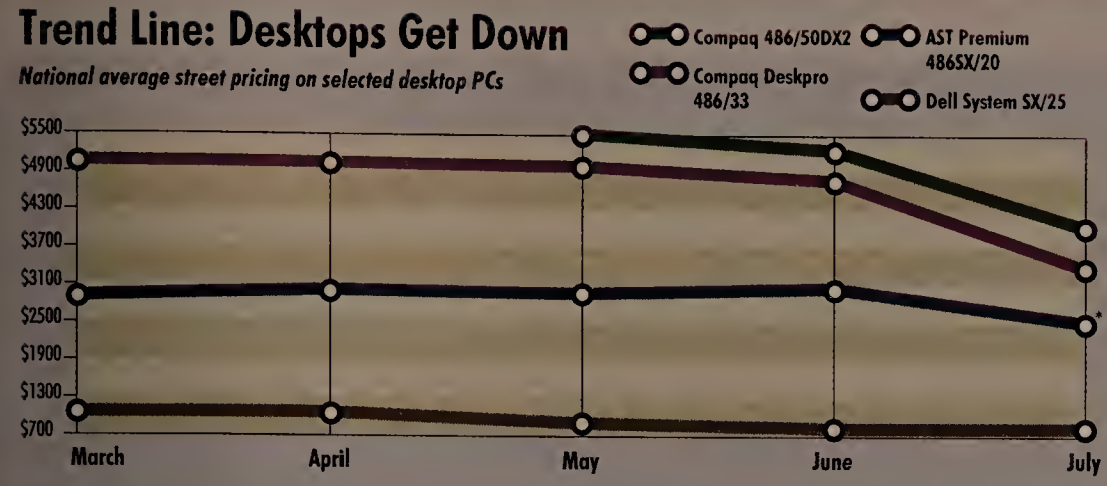
	Configuration				National				
	CPU/speed (MHz)	RAM (MB)	Hard disk (MB)	Video adapter	List	Average	Boston	Chicago	Dallas/ Ft. Worth
80386SX/SLC-based desktop PCs									
Compaq Prolinea 3/25zs	i386SX/25	2	84	VGA	$999	$930	$903	$949	$845
Dell System 325 SX	i386SX/25	2	52	VGA	$820	$820	$820	$820	$820
IBM PS/2 Model 56	i386SX/20	4	80	VGA	$3030	$2486	$2376	$2514	$2708
IBM PS/2 Model 56 SLC	386SLC/20	4	80	VGA	$3560	$2927	$2921	$2929	$3025
NEC PowerMate SX/25i	i386SX/25	2	60	VGA	$1549	$1339	$1189	$1254	$1384
80386DX-based desktop PCs									
AST Power Premium 3/33	i386DX/33	4	210	VGA	$3395	$2766	$2695	$2761	$2832
Compaq Deskpro 3/33i	i386DX/33	4	120	VGA	$1979	$1757	$1766	$1676	$1734
Compaq Deskpro 386/33M	i386DX/33	4	120	VGA	$2569	$2233	$2201	$2140	$2268
Dell System 333P	i386DX/33	4	230	VGA	$1600	$1600	$1600	$1600	$1600
80486SX-based desktop PCs									
AST Power Premium 4/25s	i486SX/25	4	210	VGA	$2995	$2447	$2427	$2381	$2585
Compaq Deskpro 486s/25M	i486SX/25	4	120	VGA	$2569	$2231	$2246	$2186	$2170
Gateway 25-MHz 486SX	i486SX/25	4	200	VGA	$1670	$1670	$1670	$1670	$1670
IBM PS/2 Model 90XP-OH9	i486SX/25	4	160	XGA	$6545	$5129	$5077	$5026	$5784
80486DX-based desktop PCs									
ALR BusinessVEISA	i486DX2/50	5	340	VGA	$5895	$4756	$4641	$4632	$4824
AST Power Premium 486/33	i486DX/33	4	210	VGA	$3795	$3141	$3151	$3087	$3172
Compaq Deskpro 486/33M	i486DX/33	4	340	VGA	$3869	$3284	$3314	$3270	$3304
Compaq Deskpro 50M	i486DX/50	8	340	VGA	$4469	$3919	$3932	$3791	$4073
IBM PS/2 Model 90 XP-OKF	i486DX/33	8	400	XGA	$9295	$7309	$7287	$7058	$7793
IBM PS/2 Model 90 XP-OLF	i486DX2/50	8	400	XGA	$9795	$7716	$7573	$7667	$7967
NEC PowerMate 486/50e	i486DX/50	4	535	none	$5699	$4677	$4388	$4559	$4751
Portables/laptops									
AST Premium Exec 386SX/20	i386SX/20	2	40	VGA-LCD	$2395	$2024	$1800	$2031	$2167
AST Premium Exec 386SX/25	Am386SXL/25	4	80	VGA-LCD	$3295	$2829	$2706	$2760	$2928
Compaq Contura 3/25	i386SL/25	4	60	VGA-LCD	$2099	$1957	$1914	$1906	$1976
Compaq LTE Lite/20	i386SL/20	2	60	VGA-LCD	$2499	$2257	$2323	$2251	$2091
Dell Dimension NL25	i386SL/25	2	80	VGA-LCD	$1849	$1849	$1849	$1849	$1849
IBM PS/2 Model N51 SLC	386SLC/16	2	80	VGA-LCD	$3295	$2801	$2824	$2734	$2665
NEC UltraLite SL/20	i386SL/20	2	80	VGA-LCD	$2199	$1854	$1792	$1686	$1952
Toshiba T3300SL	i386SL/25	2	80	VGA-LCD	$2899	$2558	$2562	$2507	$2552
Toshiba T4400SX	i486SX/25	2	80	VGA-LCD	$3399	$2990	$2968	$3032	$2972
ZDS Z-Note 325Lc	i386SL/25	4	120	VGA-LCD	$4999	$4383	$4795	$4257	$4061

From an IDC survey of more than 180 computer dealers in eight metrapaliton oreos. Figures based an ot least four price quates far each machine. Prices are based an manufocturer's stondord canfiguration without manitar.

Price Information You Need to Buy Smart

Trend Line: Desktops Get Down

National average street pricing on selected desktop PCs



*25-MHz model.

Compaq's June price reductions kicked off a giant wave of cuts that rolled through the industry. In the following weeks, suppliers trimmed their prices on most products—in some cases by more than 40 percent. You can now buy a complete 386SX-25 system from major vendors for a little over $1000. Some top-of-the-line 486s are going for only $3000 or less. You can even pick up a new 66-MHz 486DX2 machine in that price range.

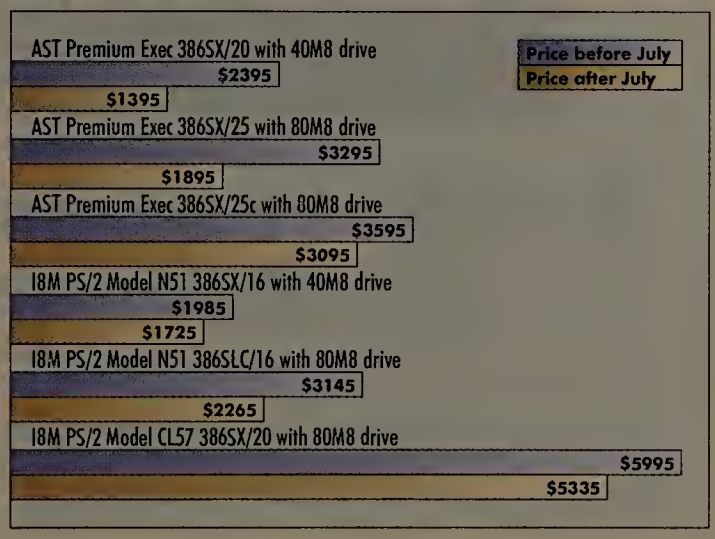
Metropolitan				
Los Angeles	Miami/ Ft. Lauderdale	New York	San Francisco Bay Area	Washington, D.C.
$874	$869	$758	$805	$834
$820	$820	$820	$820	$820
$2341	$2431	$2352	$2374	$2354
$2845	$2897	$2878	$2851	$2841
$1257	$1482	$1247	$1294	$1304
$2752	$2800	$2612	$2785	$2794
$1685	$1902	$1748	$1695	$1604
$2200	$2368	$2108	$2254	$2221
$1600	$1600	$1600	$1600	$1600
$2385	$2478	$2384	$2375	$2312
$2185	$2346	$2178	$2241	$2197
$1670	$1670	$1670	$1670	$1670
$4652	$4882	$4784	$4685	$4624
$4804	$4890	$4621	$4807	$4975
$3049	$3232	$3175	$3054	$3038
$3074	$3410	$3287	$3095	$3054
$3701	$4057	$3921	$3754	$3742
$7321	$7246	$7154	$7384	$7366
$7621	$7769	$7532	$7681	$7654
$4521	$5019	$4321	$4581	$4571
$2073	$2147	$1787	$2085	$2034
$2753	$3120	$2701	$2754	$2714
$1984	$2008	$1874	$2054	$1974
$2264	$2344	$2321	$2285	$2354
$1849	$1849	$1849	$1849	$1849
$2854	$2951	$2754	$2952	$2847
$2044	$1834	$1784	$2102	$1847
$2557	$2621	$2512	$2587	$2597
$2972	$3027	$2904	$2998	$3014
$4354	$4687	$4125	$4381	$4274

PC Futures: The Last Cut Is the Deepest

This summer's PC price cuts were deep ond pervasive. It took time for manufacturers to respond to Compoq's June initiative, but by eorly August even IBM hod done so, and street prices had adjusted accordingly. While this price war means you can snap up reol borgains, it olso meons you should keep on eye on your supplier's finoncial health. Some vendors whose appeol strongly depended on pricing, such os Northgote ond Zeos, hove been finding it difficult to keep slashing prices and have been running in the red. In this morket turmoil, Compoq quietly topped the best-seller list for the first time with its LTE Lite/25 notebook. Also of note, IBM's leoding seller is the PS/2 Model 35 SX (which lacks the much-touted Micro Chonnel bus), ond the PS/2 Model 56 SLC is coming on strong. Not everything chonged, though, as Dell ond Goteway fought for price leadership. Gateway's 25-MHz 486SX ond Dell's Dimension NL25 were desktop and portable Bargoins of the Month,[1] just as they were in May before the round of price cuts.

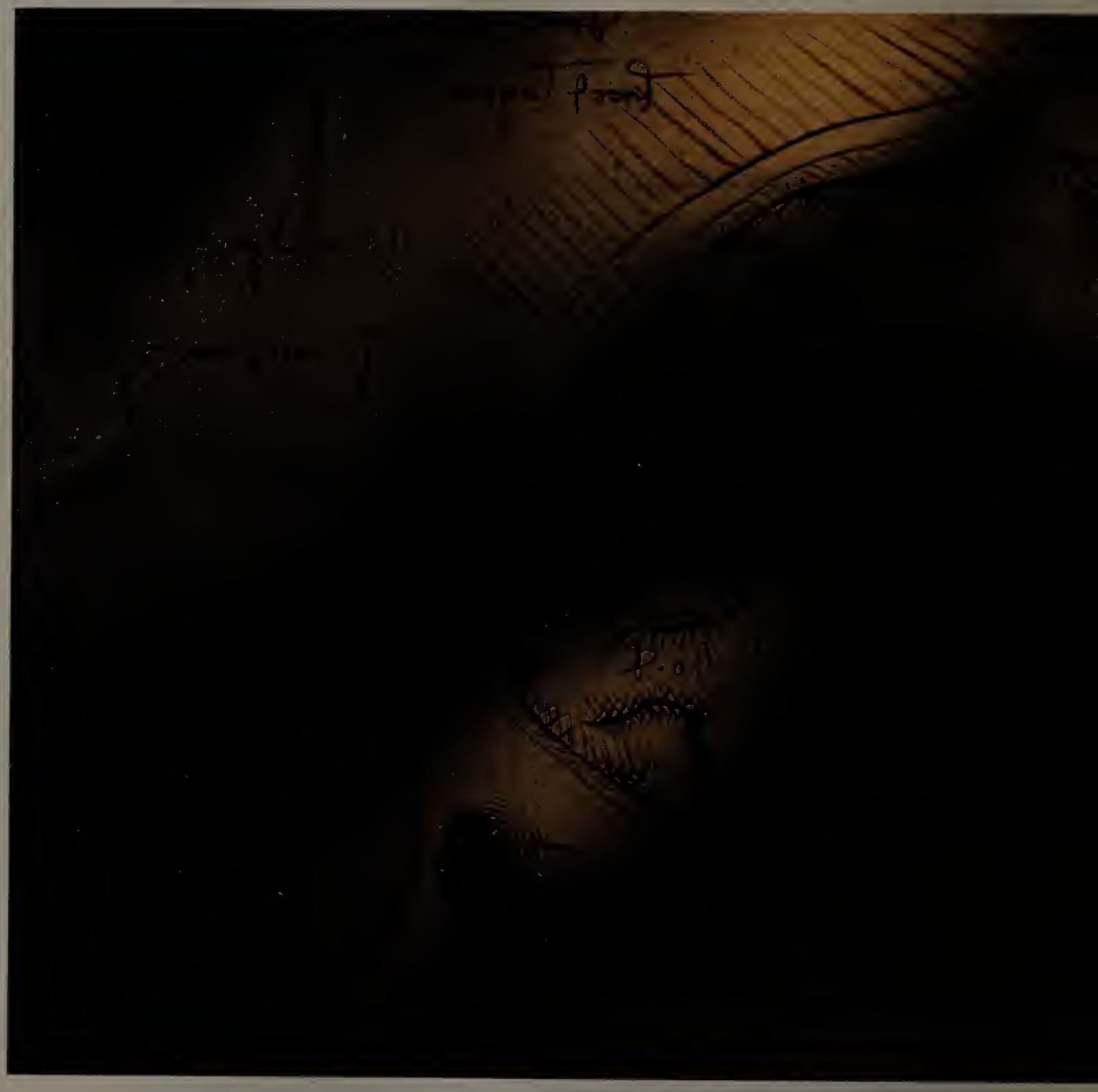
Notebook Prices Drop as Well

List prices on notebook PCs



This summer's notebook PC price cuts were as deep as those of their desktop cousins. AST and IBM, among the last major vendors to lower prices, show the spectrum on 386SX and 386SLC notebooks. Unsurprisingly, the prices of models with color screens dipped relatively slightly.

[1] Bargains of the Month are determined by adjusting prices on PCs of a given class for standard memory and storage, then finding which PC compares best.



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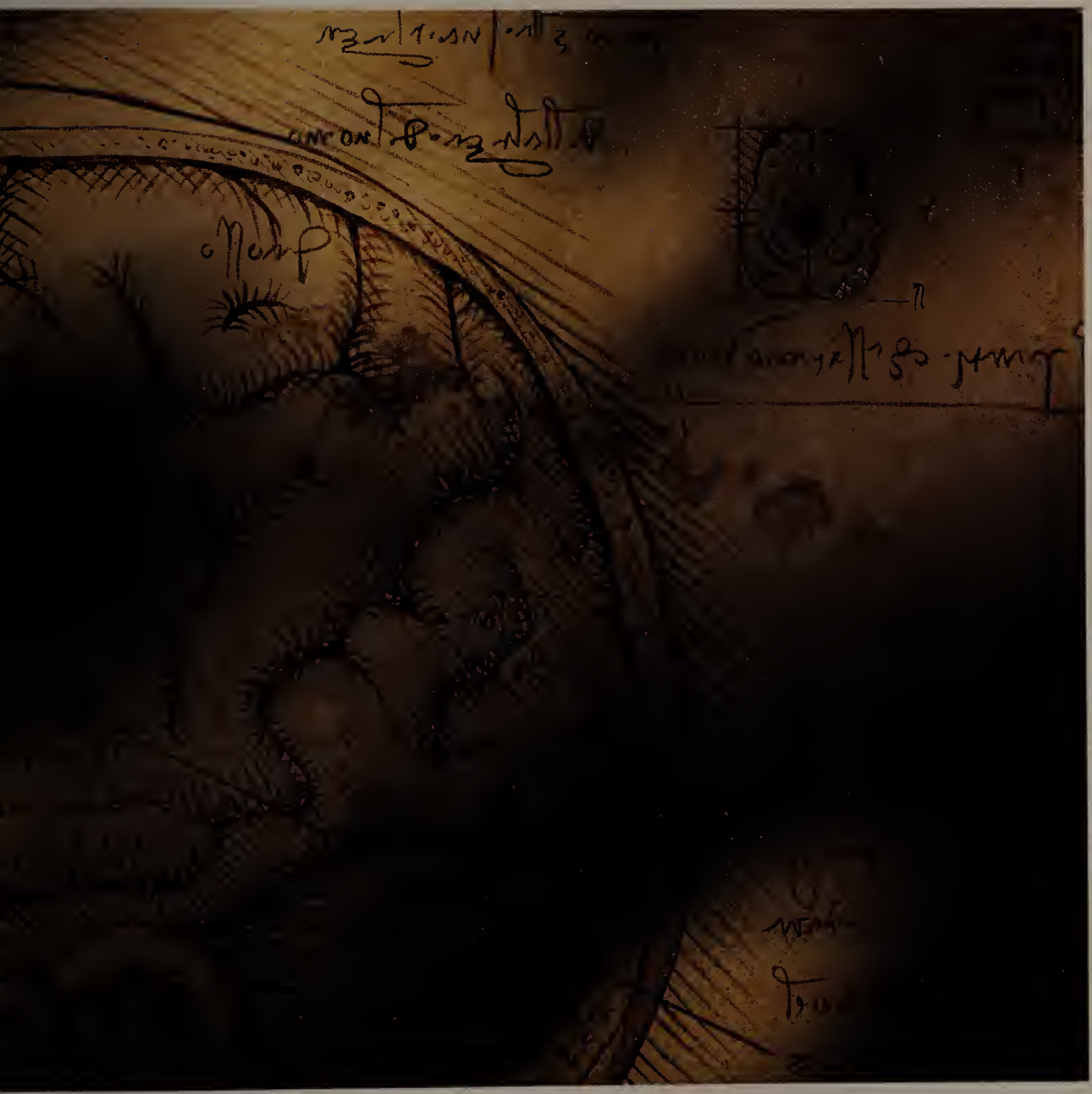

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486DX2 SYSTEMS

MAXIMUM PRICE-PERFORMANCE

Think you can't afford a 50-MHz 486? Though these 24 PCs are among the fastest we've tested, many sell fully loaded for $3000 or less. If you want a machine that's ready for tomorrow, can you afford not to buy one?

BY REX FARRANCE AND DAN MILLER

Just when you thought you had all your ducks in a row, a whole new flock of 486s appears on the scene. These new arrivals are based on the 50-MHz 486DX2 processor—one 486 performer you simply can't afford to overlook. They offer about a 20 percent speedup over 33-MHz 486DXs in average business applications and a hefty 33 percent boost in *1-2-3* performance. And the price of these PCs won't break you. In fact, they average only a few hundred dollars more than the coprocessorless 25-MHz 486SX and as little as $100 more than a 33-MHz 486DX.

Considering what 50-MHz 486DX2s offer, it's no wonder vendors are finding sales of these systems growing faster than those of other PCs, pushing the proven 33-MHz 486DX off many corporate purchase orders. Even with a tight equipment budget, no one can afford to buy yesterday's processor. These 50-MHz 486DX2s deliver the freshest technology but without the price premium that always seems to accompany the latest and greatest.

The 50-MHz 486DX2 uses the same Intel clock-doubling technology as the OverDrive chips we installed in the 486SX PCs reviewed in August—with the difference that the DX2 is factory installed and designed to fit a 486DX socket. Like all the new Intel clock-doubling chips, the DX2s process at twice the speed of the system clock.

The DX2 payoff is greatest in processor-intensive operations like spreadsheet recalculations,

PHOTOGRAPHS BY MARC SIMON, ELECTRONIC IMAGING BY NICK FAIN

NEC
MultiSync 4Fg
PUSH

which can also benefit from the built-in coprocessor. Disk and memory access times remain the same, so loading *Windows* or running a data base show less acceleration. But a 20 percent average gain over systems with a faster 33-MHz system clock is not exactly chopped liver.

Keeping Up With the Joneses

With PC technology changing fast enough to make your head spin, buyers are looking for insurance against instant obsolescence. These units come loaded with enhancements that give an immediate payback in real-world performance and productivity. For example, we were pleased to note that two-thirds of these new systems feature graphics accelerators. The Hewlett-Packard, NEC, and Swan PCs even have local-bus video, which runs at the speed of the system clock rather than at 8-MHz expansion-bus speed.

In addition, eight of these PCs came with a caching hard disk controller, a performance add-on that's becoming a standby for disk-intensive applications such as data base managers. And the Acer, Axik, Dell, HP, NEC, and Northgate machines give a chip-only upgrade path to a 66-MHz DX2.

If you question the benefits of graphics accelerators and caching disk controllers, our speed benchmarks should change your mind. The three fastest PCs overall came equipped with both.

Buying Smart: Double or Nothing

If you're buying a DX2-50, you obviously want good value in a fast system. If pure speed is your top consideration, look for the capability to upgrade to 66 MHz. If you're shopping for a server, be sure you get enough bays for storage and enough slots for network hardware.

PERFORMANCE

When your processor is crunching data at 50 MHz, speedy peripherals can make the difference between the merely fast and the truly blazing. In our performance tests, two peripherals seemed to affect overall performance the most: caching disk controllers and graphics accelerators.

Six of the eight fastest systems in this review came with caching controllers installed. Their speed advantage is particularly dramatic on disk-intensive data base applications: Systems with caching controllers averaged 63 percent faster on our *Paradox* test than those without. But if your favorite PC system doesn't come with a caching controller, don't despair: You can buy one with a full 4MB cache for as little as $400 or less on the street, and installation is a quick and easy procedure.

Two-thirds of the machines we reviewed came with either third-party graphics accelerator boards or integrated accelerator chips on the motherboard, and with good reason: Systems with accelerated graphics were 12 percent faster than those without on our most graphics-intensive benchmarks. As with caching controllers, if a system doesn't have an accelerator, installing one yourself is a simple matter. The Diamond Stealth VRAM and ATI's Graphics Ultra boards were the most common accelerators in our review units. (For more buying advice on graphics controllers, see our March review of fast video boards.)

Of course, other factors affect performance as well. For example, in our tests, systems with an additional external memory cache were generally speedier than those that relied entirely on the 486's internal cache.

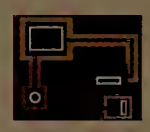
We ran each machine through our application benchmarks, weighting the *1-2-3* test most heavily. The Acma and Tangent Model 450ex were the fastest systems overall.

PRICE

Speed is going to cost you. Still, you can find some remarkable bargains among these DX2s.

We base our evaluations on street prices. For every system except those sold direct, we call at least three PC dealers in each of eight major cities across the country to get price quotes; we then average the results for each system. Our researchers price units with the same standard configuration: 8MB RAM, a 200MB to 240MB hard disk (except where noted), floppy drive, VGA and color display, one parallel and two serial ports, keyboard, mouse, DOS 5.0, and *Windows*. Other exceptions are noted in text.

When all the calls were made, the lowest street price belonged to the Compudyne 4DX2/50: a remarkable $1999. Note: At the time we were collecting our street prices, several vendors announced dramatic list price cuts.



EXPANDABILITY

Upgradability on a DX2? Don't laugh. Some systems come with both 25-MHz and 33-MHz clocks on the motherboard. When Intel releases its DX2-66 later this year, if you have the right machine, you'll be able to swap out the DX2-50 for the faster 66, change a jumper, and get an estimated 20 to 30 percent performance improvement. Swapping chips is particularly easy if the system has a zero insertion force (ZIF) socket on its motherboard.

Of course, processors aren't all you may want to upgrade. If you're shopping for a desktop system, look for one with at least four free expansion slots, preferably five—enough for drive controller, graph-

Finding the Right Match

To help you find your perfect match in this hot category, we rounded up 24 of the first 50-MHz DX2 PCs available. We ran them through a gauntlet of stiff compatibility tests, which they all passed.

You expect speed from a 50-MHz processor, and these 486DX2s deliver. The fastest system overall, the Tangent Model 450ex, outran the quickest of the 33-MHz 486s we reviewed in June by a fantastic 47 percent overall. And even the pokiest 50-MHz 486DX2s matched the speed of a moderately fast 33-MHz 486DX. When we totaled our benchmarks for the 24 486DX2s, however, we were surprised at the wide range of results. The slowest 50-MHz 486DX2s took about half again as long to finish our tests as the Tangent Model 450ex.

In price—as important a factor as performance—the systems showed an even greater variation. For example, for the cost of an IBM PS/2 Model 95 XP 486DX2-50, you could buy almost five $1999 Compudyne 4DX2/50s! But you can buy any one of the seven least expensive systems—loaded with 8MB of RAM, a 200MB to 240MB hard disk, VGA and color display, keyboard, mouse, *Windows,* and DOS 5.0—for less than $3000 on the street.

Expandability—including CPU upgradability—is important too. It may seem strange to talk about upgrading a 50-MHz CPU, but some of these systems have multiple clock speeds, which make them chip-upgradable to 66-MHz DX2s. For more information about how this processor performs, see "66-MHz 486DX2s: The World's Fastest PCs."

Service and support are as important as expandability. We check by calling each system vendor and posing questions about typical technical support problems. In addition, we factor in availability of on-site service, repair turnaround policy, and so on.

After we crunched all the numbers, Acma's 486DX2-50 and Gateway 2000's 50-MHz 486DX2 won *PC World*'s Best Buy laurels. The $3495 Acma has fantastic overall performance, excellent service, and very good expandability. Gateway has an outstanding $2695 price—with free business software thrown in, excellent service and support, and very good design and construction.

Axik's Ace Cache 486DX2-50 also has a foot on the top rung, with great performance and excellent expandability. It barely misses a Best Buy because it's a direct-sales system with no on-site service option. (Axik promises to offer the option soon.) The Eltech 4500DX2 and Tangent Model 450ex also rate high. It would be hard to go wrong with any of these top five systems. When you get right down to it, maybe having a lot of choices isn't so bad after all.

Rex Farrance and Dan Miller are assistant editors for PC World.

For more information about all products in this article, circle reader service no. 905.

ics card, and network connector plus one or two for future expansion. You'll also want a minimum of four drive bays: one for a hard drive, one for a tape backup system, and two for floppies. (You can save a bay by using one of the new combination units, which put both 3½- and 5¼-inch drives in a single bay.)

If you're looking for a network server, consider an EISA system. Though the EISAs we looked at averaged $1000 more on the street than the ISAs, they let you use 32-bit peripherals, which can increase data throughput on a big, busy network. When shopping for a server, make sure you can outfit your system with plenty of fast RAM. Most of these systems can accommodate up to 64MB of it.The Acer, Axik, and Northgate all score high for expandability.

SERVICE AND SUPPORT

Competition in the PC business has made decent customer service far more common than it once was. Every vendor here offers at least a one-year warranty. Most have toll-free support. Most also offer free or low-cost on-site service.

To check the quality of technical support, we call each vendor's central support line and ask three questions of varying difficulty. We then rate the responses for promptness, courtesy, and accuracy and factor in such extras as how many hours a day the phone lines are open and whether the vendor provides customer service bulletin board and fax lines. We rate dealer support by looking at the vendor's policies on dealer training, inventory, and support staff.

Because you're dealing with human beings when you call tech support, there's going to be some variation in the same vendor's ratings from review to review. This time around, Acma, ALR, Dell, Gateway, Northgate, Reply, Tangent, USA Flex, and Wyse all provided top-notch service and support.

DESIGN AND CONSTRUCTION

Buying a fancy processor is no reason to ignore the nuts and bolts of buying a system. You still need a sturdy, well-designed case, preferably one that opens with the turn of a thumbscrew or two. Ideally, it should have the on/off and reset buttons and the keyboard socket on the front panel. It should also have enough ports to plug in a mouse, a printer, a modem, and any other peripherals you might need. AST, Compaq, CompuAdd, Hewlett-Packard, IBM, NEC, Reply, Swan, and Tangent all receive top marks for design.

AcerPower 486DX2-50WU

PROS: Fost, 2MB caching disk controller, chip-upgradable to 66-MHz DX2
CONS: Poor service and support, case flimsy with top off

We can't fault the performance of the $3960 AcerPower 486DX2-50: It was fifth fastest overall, including third place on the *WordPerfect* test and fourth on *Windows* and *AutoCAD.* And if your applications demand a lot of disk I/O, you'll appreciate the speedup provided by its 2MB UltraStor Ultra 15C caching disk controller. Want more speed in the future? This desktop system will be chip-upgradable to Intel's 66-MHz 486DX2 CPU.

The case snaps on and off with no screws required, and inside you'll find five free slots and two internal and four external drive bays. But we don't recommend moving this PC with its cover off, as the internal case is too flexible. Acer sells a year of on-site service for $99. Otherwise, tech support rates low. It is dealer only, with no Acer guarantee that resellers employ support staff. The Acer has much to offer, but if technical support matters, think twice.

The Acer is an already fast machine with chip upgradability to 66-MHz 486DX2.

The red-hot Acma 486DX2-50 is fast, good-looking, and very well supported.

Acma 486DX2-50

PROS: Second-fastest machine in roundup, excellent service and support, 4MB caching controller, two floppy drives **CONS:** Weitek socket hard to access

Want a top-speed desktop system with an affordable price and excellent support? The Acma 486DX2-50 has it all. A strong second on overall performance, the $3495 Acma did consistently well on all tests.

Inside the sturdy compact case, you'll find five free slots, four external drive bays, 1.2MB and 1.44MB floppy drives, and a 4MB UltraStor Ultra 15C caching disk controller that really speeds disk-intensive tasks. Getting to the CPU and the memory is no sweat, but seating a Weitek coprocessor beneath the drive cage would be a tight squeeze. Support is terrific, with a toll-free connection—even on weekends—to knowledgeable, responsive technicians; and a year of free on-site service contributes to the excellent service rating. Terrific speed, support, and a reasonable price make the Acma a terrific value—and a Best Buy.

PC WORLD BEST BUY

ALR Flyer 32DT 4DX250 Model 200D

PROS: Street price under $3000, excellent service and support, excellent 1-2-3 score, CPU-card design **CONS:** Limited space for internal storage devices, slow Paradox and AutoCAD performance

The ALR Flyer 32DT 4DX250 Model 200D is a clean machine with a good-looking $2986 street price. The *1-2-3* score is excellent, falling only 5 percent behind the leader's. But the *Paradox* and *AutoCAD* marks trail toward the bottom, so add a caching controller if you're bent on turning this trim workstation into a data base machine.

The thoughtful design puts the CPU and Weitek socket on a replaceable card. The three free standard 16-bit slots hold cards horizontally beneath the lid's low ceiling, and a proprietary 16-bit slot will accept a scaled-down ALR fax-modem or SCSI adapter. You get just three drive bays, however. ALR service is among the best and includes unlimited toll-free support and a year of on-site service for a mere $34. If you're looking for a handsome workstation, this ALR makes an attractive choice.

The trim ALR Flyer 32DT 4DX250 is the quintessential high-powered desktop workstation.

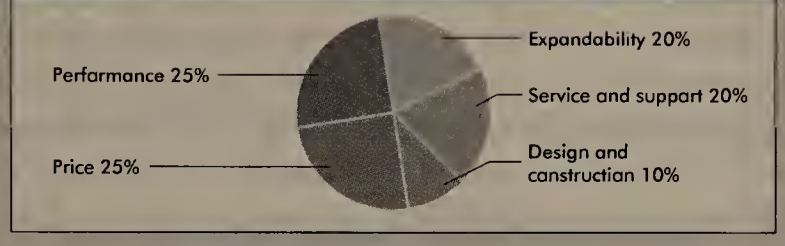
Two-Way Tie for the DX2 Crown

The Acma 486DX2-50 and Gateway 2000 50MHz 486DX2 both earn Best Buys—the Acma for its great speed and the Gateway for its low price. Both systems come with top-notch service and support.

PC WORLD BEST BUY

Of our two Best Buys, the **Acma** has the clear edge over the **Gateway** on speed, but the **Gateway** costs $800 less and includes a choice of seven business applications. If the runner-up **Axik** had on-site service, it would have joined them in the winner's circle, as would the **Eltech** if it had been faster and the **Tangent** if it had been less expensive. You can credit increased competition for the generally high service-and-support scores.

Key Buying Issues: Percentage of Importance



Excellent ★★★★
Good ★★★
Fair ★★
Poor ★

	Reader service number	Performance	Price*	Expandability	Service and support	Design and construction	Overall value
AcerPower 486DX2-50WU	657	☆☆☆½	☆☆½	☆☆☆☆	☆½	☆☆☆½	★★★
Acma 486DX2-50	658	★★★★	★★★	★★★½	★★★★	★★★	★★★★
ALR Flyer 32DT 4DX250 Model 200D	659	☆☆½	☆☆☆½	☆☆☆	☆☆☆☆	☆☆☆	★★★
AST Power Premium 4/50d	660	☆☆☆	☆☆	☆☆☆½	☆☆☆½	☆☆☆☆	★★★
Axik Ace Cache 486DX2-50	661	☆☆☆☆	☆☆☆½	☆☆☆☆	☆☆½	☆☆☆½	★★★½
Blackship BLK 486DX2/50 EISA	662	☆☆☆½	☆☆½	☆☆☆	☆☆☆½	☆☆½	★★★
Compaq Deskpro 486/50M	663	☆☆☆	☆☆½	☆☆☆	☆☆☆½	☆☆☆☆	★★★
CompuAdd 450DX2	664	☆☆	☆☆☆	☆☆☆	☆☆☆½	☆☆☆☆	★★★
Compudyne 4DX2/50	665	☆	☆☆☆☆	☆☆☆	☆☆☆½	☆☆½	★★★
Dell 486D/50	666	☆☆½	☆☆☆	☆☆☆½	☆☆☆☆	☆☆☆	★★★
Eltech 4500DX2	667	☆☆☆	☆☆☆☆	☆☆☆	☆☆☆½	☆☆☆	★★★½
Gateway 2000 50MHz 486DX2	668	★★★	★★★★	★★★	★★★★	★★★½	★★★★
Grid MFP/450	669	☆☆	☆☆	☆☆	☆☆☆½	☆☆☆	★★½
Hewlett-Packard Vectra 486/50U PC	670	☆☆☆	☆½	☆☆☆½	☆☆☆½	☆☆☆☆	★★★
IBM PS/2 Model 95 XP 486DX2-50	—	☆☆½	½	☆☆☆½	☆☆☆	☆☆☆☆	★★½
Insight 486DX2-50	671	☆☆	☆☆☆☆	☆☆☆	☆☆☆½	☆☆☆	★★★
NEC PowerMate 486/50i	672	☆☆½	☆☆	☆☆☆	☆☆☆½	☆☆☆☆	★★★
Northgate Elegance ZXP-DX2-50	673	☆☆	☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆½	★★★
Reply Model 32 486DX2/50	674	☆½	☆☆	☆☆☆½	☆☆☆☆	☆☆☆☆	★★★
Swan 486DX2-50DB	675	☆	☆☆☆	☆☆☆½	☆☆☆½	☆☆☆☆	★★★
Tandy 4850 EP	676	☆☆	☆☆½	☆☆	☆☆☆½	☆☆☆	★★½
Tangent Model 450ex	677	☆☆☆☆	☆☆	☆☆☆	☆☆☆☆	☆☆☆☆	★★★½
USA Flex 486/DX2 50MHz	678	☆☆	☆☆☆☆	☆☆☆	☆☆☆☆	☆☆½	★★★
Wyse Decision 486/50DX2	679	☆☆	☆☆½	☆☆☆	☆☆☆☆	☆☆☆	★★★

Overall value is produced by multiplying each categary rating by its weight percentage, summing the results, and grading an a curve ta the nearest half number.

* Price ratings are based an street prices. Befare the ratings are calculated, however, the street prices are adjusted ta allaw far bundled saftware and hardware aver and abave aur standard canfiguratian. One-quarter af the list price af the saftware is deducted. If the system is sald via dealers, 70 percent af the list price af the extra hardware is deducted; if the system is sald direct, 100 percent af the list price af the extra hardware is deducted. Bundled saftware and extra hardware far each system are nated in the Features Evaluatian.

AST Power Premium 4/50d

★★ **PROS:** Excellent design and construction, EISA bus, CPU-card construction, excellent 1-2-3 performance, software-upgradable BIOS **CONS:** High price

AST was an upgradable-CPU pioneer with its passive-backplane, Cupid-architecture design. The compact-desktop EISA Power Premium 4/50d carries on the modular tradition, providing five free EISA slots—two of which double as CPU-speed Cupid slots. Another Cupid slot is occupied by the processor/memory module. You can fill the other two to expand RAM capacity from 16MB to its lofty 80MB limit. Three of the five drive bays are externally accessible. Its *1-2-3* test score was an insignificant 3 percent behind the leader's. Otherwise, performance was average.

The AST's security extras include a chassis lock on the easy-open case and a password option in ROM. Very good service and support includes a toll-free line with weekend support, and BBS and fax support. What's the downside? Cost. A $4684 street price makes for a hefty expenditure. But the higher tariff nets you an EISA bus and terrific design.

AST's CPU-speed Cupid slots and modular construction give this EISA PC great expandability.

The fast Axik's ZIF socket and adjustable system clock pave the upgrade path to 66 MHz.

Axik Ace Cache 486DX2-50

★★½ **PROS:** Top-three performance, price under $3000, chip-upgradable to 66-MHz DX2, ZIF CPU socket **CONS:** No on-site service at time of review

The Axik Ace Cache 486DX2-50 is one speedy PC, joining the Tangent and Acma models at the top of the chart. The Axik tied for second on *WordPerfect*, while a 1MB Promise Technologies DC-2032 caching controller aided a strong third on both *Paradox* and *AutoCAD*. This fairly compact tower has great internal accessibility, six slots free, and a generous eight drive bays. Axik's baby motherboard includes a ZIF socket and a jumpered clock, which enables a 66-MHz 486DX2 migration.

The $2998 price adds more polish to the Axik's sheen. Service includes a toll-free number, weekend support, a 13-month warranty, and a two-day service turnaround. But Axik didn't provide something we consider essential to a machine sold direct—on-site service. At press time Axik assured us it planned to offer it soon. That's great news: With an on-site service option, this fine PC would be an easy Best Buy.

Blackship BLK 486DX2/50 EISA

★★ **PROS:** Fast, very good service, EISA bus, SCSI caching controller, lowest-priced EISA system **CONS:** Wasted space in big case, blocked expansion slots

The Blackship BLK 486DX2/50 EISA is the fourth fastest PC overall, with a great *1-2-3* time and a third on the *WordPerfect* test. It came with a 1MB AMI EISA SCSI caching disk controller with an external port. And the $3792 price is the best of the EISA bunch. What's more, Blackship gives fine, consistent service and support.

This desktop would have profited by a more thoughtful approach to its design, however. One of the four free EISA slots is partially blocked by the SCSI hard disk—you can get a half-card in at best. The CPU is also buried under one of the two internal drive bays (there are four externally accessible bays), and the memory is hard to reach under the power supply. This is the lowest-priced EISA PC here, but if you want top design, you can buy the Compaq Deskpro 486/50M EISA model for only about $100 more.

This is the cheapest EISA PC here, and it's fast—but the design could be better.

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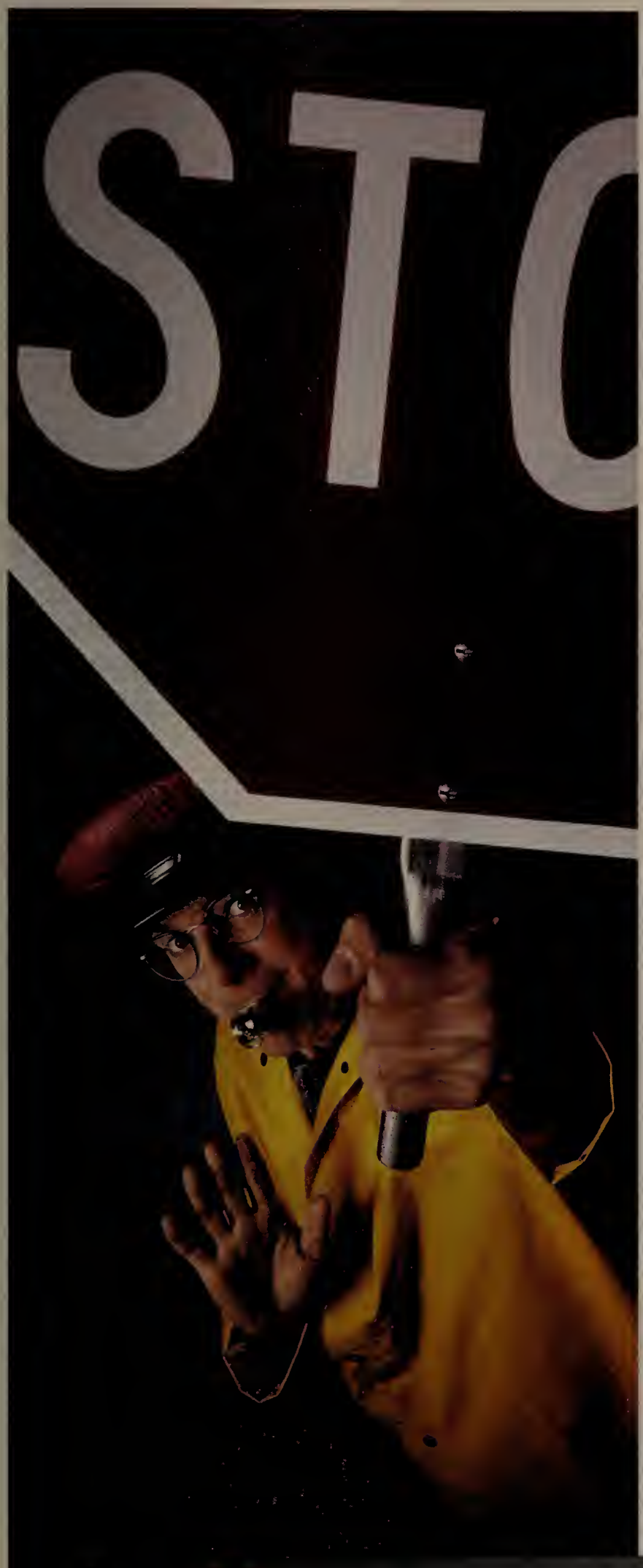

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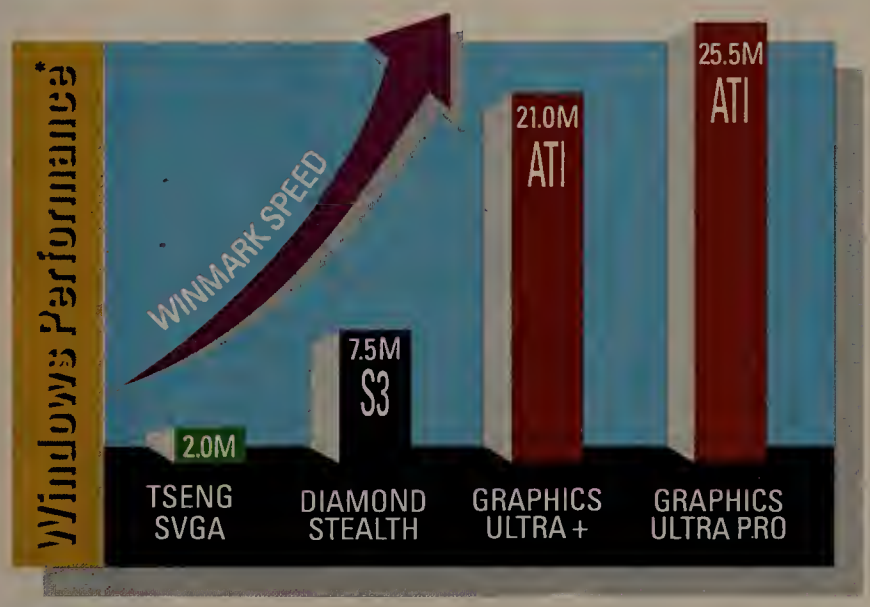

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Circle 5 on reader service card

50-MHz 486DX2 Prices Join the Plunge

Not long after we did our initial pricing research for this review, the industry as a whole went through one of the most dramatic across-the-board waves of price cutting we've ever seen. Spurred by Compaq's new low-end lines, PC vendors everywhere were forced to cut their prices to keep in step. As a result, only 5 of the 24 vendors we reviewed (Acma, Compudyne, Gateway, Insight, and Tandy) kept their price tags the same. With some vendors, such as Acer and Reply, prices dropped 40 percent in two months; the average reduction was 16 percent. It's worth noting that the figures in the table below are list prices; your costs may not drop to the same degree.

	List price as of August 1992 [1, 2]	Price drop from June 1992
AcerPower 486DX2-50WU	$3750	$2430
Acma 486DX2-50	$3495 [3]	none
ALR Flyer 32DT 4DX250 Model 200D	$3367	$275
AST Power Premium 4/50d	$4190 [4]	$1140
Axik Ace Cache 486DX2-50	$2895 [5]	$103
Blackship BLK 486DX2/50 EISA	$3495	$297
Compaq Deskpro 486/50M	$4444	$323
CompuAdd 450DX2	$2934	$286
Compudyne 4DX2/50	$1999	none
Dell 486D/50	$3049	$299
Eltech 4500DX2	$2299 [5]	$200
Gateway 2000 50MHz 486DX2	$2695 [6]	none
Grid MFP/450	$3799	$954
Hewlett-Packard Vectra 486/50U PC	$5774	$1326
IBM PS/2 Model 95 XP 486DX2-50	$11,239	$2157
Insight 486DX2-50	$2377	none
NEC PowerMate 486/50i	$4216	$982
Northgate Elegance ZXP-DX2-50	$2949	$350
Reply Model 32 486DX2/50	$4210	$2960
Swan 486DX2-50DB	$3555 [7]	$200
Tandy 4850 EP	$4398	none
Tangent Model 450ex	$3995	$590
USA Flex 486/DX2 50MHz	$2259 [8]	$390
Wyse Decision 486/50DX2	$3659	$1183

[1] Except as noted, price includes 8MB RAM, flappy drive, hard drive, VGA, color VGA monitor, mouse, Windows, and DOS 5.0.
[2] August 1992 street prices unavailable at press time.
[3] Includes QAPlus.
[4] Includes Microsoft Works for Windows, Andrew Tobias' Managing Your Money, ond Quicken.
[5] Includes Microsoft Works for Windows.
[6] Includes your choice of Microsoft software.
[7] Includes Microsoft Works for Windows, Quicken, and WeolthBuilder.
[8] Includes PFS:WindowWorks.

Compaq Deskpro 486/50M

★★★ **PROS:** Excellent design, CPU card with Weitek socket, top 1-2-3 and dBASE times, EISA bus, security-lock case **CONS:** None significant

This Compaq design is so versatile, we've reviewed it twice before with 25-MHz 486SX and 33-MHz 486DX processor cards installed (in March and June, respectively). Each time, we lauded the great engineering—which includes a memory controller that adjusts to new CPU speeds, and a modular design that puts the processor, EISA bus, memory, video controller, and I/O controller on separate cards. And each time we highlighted the painfully high price. But this time, Compaq has cut its street price to an estimated $3909. The Deskpro was first on *1-2-3* and *dBASE* and third on *Windows*. You get four free EISA slots and four bays, an easy-open compact security-lock case, and great documentation.

Compaq tech support is toll free, with dealers providing the rest of the service. The 486/50M's modular upgrade path to 66-MHz DX2 and attractive pricing makes it the best EISA value here.

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Circle 12 on reader service card

66-MHz 486DX2s: The World's Fastest PCs

Is 50 MHz not fast enough? Never fear, the first DX2-66s are here.

As we go to press, Intel is preparing to release the DX2-66, the latest of its doubled processors. Like the DX2-50, this new chip doubles the speed of the system clock and so runs at 66 MHz internally and at 33 MHz when communicating with the rest of the system.

The most obvious attraction of the DX2-66 is performance: Our tests show that systems using this chip can run up to 28 percent faster than identically configured DX2-50s (see chart at right) and 30 to 40 percent faster than the fastest 486/33s we've tested (see our June 1992 issue).

The other advantage of the DX2-66, as with the DX2-50, is that vendors can put the chip into existing motherboard designs with minimal reengineering. Vendors can ship these PCs more quickly and cheaply than if they had to design the system from scratch—and that means more bang for *your* buck.

To find out just how hot this new chip will be, we took an early look at the first two DX2-66 systems we could get our hands on. These offerings from Dell and Hewlett-Packard

The most obvious attraction is performance: Our tests show systems using the DX2-66 chip run up to 28 percent faster than identically configured DX2-50s and 30 to 40 percent faster than the fastest 486/33s we've tested.

are identical to their DX2-50 counterparts in every detail except for the processor—but what a difference an important detail like that can make!

Dell 486D/66

This Dell system first arrived at our lab as a 20-MHz 486SX. We upgraded it to a DX2-50 for this review, and then to a DX2-66 when our sample CPU arrived. This upward migration was as simple as dropping the new chip into the socket and moving a jumpered switch to adjust the system clock from 20 to 25 to 33 MHz.

In its incarnation as a DX2-50, this machine was about 7 percent slower than the first-place Compaq on our processor-intensive *1-2-3* test. But with the DX2-66 in place it beat the Compaq's time by about 13 percent. Using the DX2-66 in place of the DX2-50 improved performance on every other test as well—19 percent on *Windows* and 18 percent on *dBASE*.

Of course, you get the same smart design (thumbscrews to open the case, diagnostic LED on the front panel) and expandability (six expansion slots and four drive bays) that you do in the DX2-50. You also get the

CompuAdd 450DX2

★★★ **PROS:** Excellent design ond construction, lots of room for exponsion cords, two-in-one duol floppy drive, very good service **CONS:** Slow

Buyers have reason to feel comfortable with CompuAdd, a company with a fine track record for service and 120 retail outlets in 37 states to augment its direct sales. The company's 50-MHz offering, the 450DX2, comes in a full-size desktop package with great internal accessibility and plenty of room for peripherals in seven free slots. Three of its five 5¼-inch drive bays are externally accessible; CompuAdd fills one external bay with a dual-drive unit that provides both standard floppy drives and one internal bay with the hard disk. And CompuAdd labels every port.

The price is a reasonable $3220, and for 15 percent extra, you can extend the standard year of on-site service to three years. Unfortunately the CompuAdd 450DX2 ran slow in our benchmarks, landing in the bottom quarter overall and fourth from last on *1-2-3*. This PC is still a fairly good buy, just not the best choice if you're looking for speed.

The CompuAdd 450DX2 is very well put together, but this model won't set any speed records.

same high-quality service and support, including a year of on-site service and toll-free tech support that's available 15 hours a day.

A Dell DX2-66, in the same configuration as the DX2-50 (244MB hard drive, 8MB RAM, color monitor) should cost you $3549—$200 more than the Dell DX2-50.

Hewlett-Packard Vectra 486/66U PC

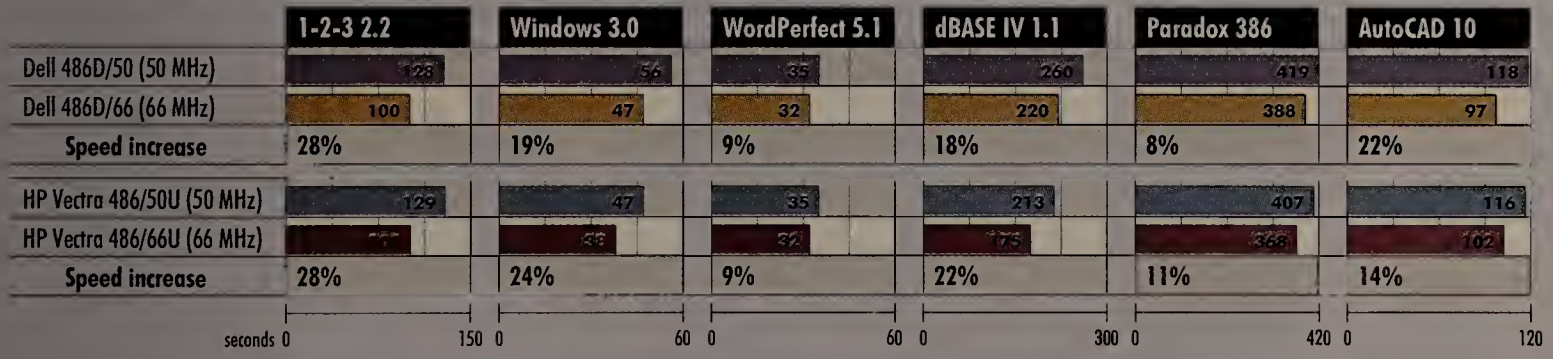
Upgrading the Vectra 486/50U PC to 66 MHz was even easier than upgrading the Dell. The reason? All the Vectra U systems have HP universal upgrade sockets: You don't even have to take out the original chip. And once you add a faster processor, you don't have to fool with any jumper switches, because the system detects which chip is being used and adjusts the clock accordingly.

When we popped the new chip in this EISA PC and ran our performance tests, we found the Vectra's performance improved a bit more than the Dell's. For example, at 66 MHz the HP was 24 percent faster on our *Windows* test than it was at 50 MHz; the Dell, by contrast, was 19 percent faster. The Hewlett-Packard also improved more than the Dell on our *dBASE* and *Paradox* tests.

There is no other difference between the HP with a 50-MHz processor and a 66-MHz CPU. It still has the same light, easy-open case, the same efficient internal layout, the same 128K write-through cache and local-bus video, and the same diagnostics and security features stored in ROM.

HP says that the Vectra 486/66U PC with 4MB of RAM and a 240MB hard drive should list for $4499.

While 50-MHz 486DX2s should give desktop users all the power they'll need, some users will always be searching for more. This initial look at 66-MHz iron indicates that you can expect a heat wave.



Compudyne 4DX2/50

★★★ **PROS:** Lowest price in the review
CONS: Poor performance, poor documentation

We did a double take on the Compudyne 4DX2/50's street price: At $1999, this system undercut the next cheapest system by almost $400! This compact features a lightweight plastic case—to get inside, just back out one screw and lift the lid. Three of its four drive bays are already filled with two floppy drives and the hard disk. That leaves just one accessible bay, plus three 16-bit and two 8-bit expansion slots.

Compudyne is Comp USA's house brand, but you can also buy a 4DX2/50 direct if there's no Comp USA nearby. You get a year's free on-site service, and Compudyne has improved the unresponsive technical support we noted in our June review—this time all our calls were answered. The problem is sluggish performance, third from last overall and last on *WordPerfect*, *Paradox*, and *AutoCAD*. The price is fantastic, but the system's no great bargain unless price means almost everything.

The Compudyne 4DX2/50 features an astonishing $1999 street price, but it was third slowest overall.

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Dell 486D/50

★★★ **PROS:** Excellent service and support, chip-upgradable to 66-MHz DX2, good 1-2-3 performance **CONS:** None significant

Among direct vendors, pioneering Dell has achieved a top rank in buyer trust for service and reliability. The 486D/50 is a compact desktop with room for peripherals in six slots and four drive bays. We reviewed this PC in August with a 20-MHz 486SX installed; the 486D/50 uses a jumpered clock that leaves the door open for a chip-level upgrade to the Intel 66-MHz 486DX2. As it is, the 486D/50 posted a quick *1-2-3* score, but overall performance was just average.

Dell looks after the fine points, giving you a thumbscrew-secured case, good inside accessibility, and a diagnostic LED on the front panel. The company also provides a year of free on-site repairs, a 24-hour on-site–response policy, and 15 hours of daily, toll-free tech support. And at press time, Dell dropped its $3348 price to an enticing $3049. Even without this price cut, we'd recommend this well-made PC.

Dell's jumpered clock leaves room for a chip-only upgrade to 66-MHz 486DX2.

Eltech, always a price leader, will sell you the 4500DX2 for a budget-conscious $2499.

Eltech 4500DX2

★★½ **PROS:** Third best price in review, caching disk controller, two floppy drives **CONS:** Drive cage hangs over CPU

The Eltech 4500DX2 costs a mere $2499. It's the best choice here for the acutely price conscious—a very good system at a fine price. Better-than-average speed, including a fourth-place finish on *WordPerfect*, contributes to the value. *dBASE* performance was just middling, but the Eltech managed a solid fifth on *Paradox*, even though the four machines ahead of it had caching disk controllers with larger caches. If you want to cache larger files, just $20 will upgrade the Eltech's 512K Promise Technology DriveCache DC-2031 to 1MB.

The stylish case is attached with standard screws, and inside you'll find four slots and five front-accessible drive bays. Eltech labels all its ports, but the documentation could be better. Service is fine, with toll-free support even on weekends and six months' free on-site service (extendable to a year for $69). All in all, this PC is a real bargain.

Gateway 2000 50MHz 486DX2

★★★★ **PROS:** Excellent price, excellent 1-2-3 performance, fine service and support, programmable keyboard **CONS:** None significant

Want 50-MHz speed on a budget—with free business software thrown in? The Gateway 2000 50MHz 486DX2 is your Best Buy. While it doesn't match Acma's Best Buy for sheer sizzle, its $2695 price saves you a healthy $800. The Gateway is fast on *1-2-3* and *Windows*, but on *Paradox* and *AutoCAD* it fell behind the PCs with caching disk controllers.

This full-size desktop has six free slots and five bays; two of three external slots are occupied by floppy drives. Service is super, with a year of free on-site service and daily and weekend toll-free support. The 124-key programmable keyboard is excellent. And Gateway gives you one of seven packages: *Excel, Word for Windows, PowerPoint, Paradox, Project for Windows, Windows Programmer Pack*, or an *Entrepreneur Pack* software library. All these pluses add up to an easy Best Buy.

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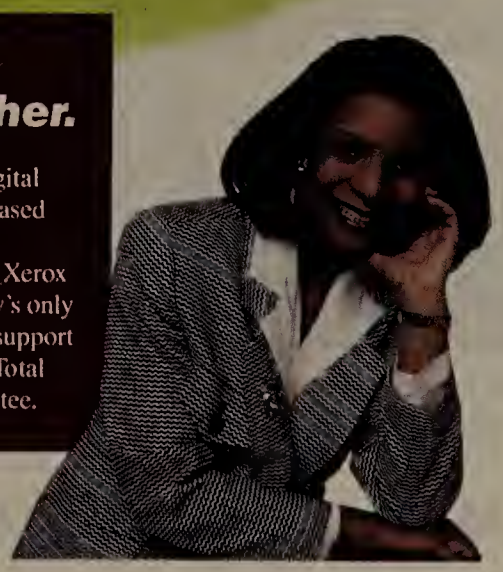

Tammy M. Johnson
Xerox Account Representative

Color documents were always of supreme importance to the people at this world-famous movie and publishing company. In fact, they spent thousands per month on outside color copying services. They wanted their own machine but no one had put together the kind of performance and support they needed. Then Tammy Johnson and the Xerox team introduced them to the Xerox 5775 Digital Color Copier.

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Grid MFP/450

★★½ **PROS:** Slimline case, easy accessibility, very good customer service
CONS: Slow, little expandability, expensive

While the Grid MFP/450 is a perfectly respectable system, there's little to make it stand out from the crowd. Its performance, for example, is only so-so. One possible explanation: no external memory cache.

Although video and I/O functions are integrated on the motherboard, the machine is less expandable than you might want. When you open the slim-line case and fold out the power supply and Quantum hard drive, you'll find just three free 8/16-bit slots on a riser card. For storage, there are only three drive bays. If you want to upgrade the processor in the future, you won't be able to—the system has just the one 25-MHz system clock, so there's no way to upgrade to a 66-MHz chip. Finally, the Grid is virtually identical to the Tandy unit reviewed, but it costs more: This system will run you an estimated $4753 on the street—making it one of the more expensive systems here. You could do better.

Though the Grid MFP/450 is nicely compact, it won't win any prizes for performance.

HP's Vectra uses fast local-bus video and upgrades to a DX2-66 with a simple swap of chips.

Hewlett-Packard Vectra 486/50U PC

★★ **PROS:** Good performance on graphics, easy upgradability to DX2-66
CONS: Expensive, shortage of open drive bays

The Hewlett-Packard Vectra 486/50U is one of the most intelligently designed systems here. Inside the easy-open case, the power supply and Quantum hard disk swing up and out to give you easy access to the EISA motherboard. There you'll find a 128K write-through cache and HP's own Ultra VGA+ local-bus accelerated video; the latter may help explain the Vectra's particularly good performance on our *AutoCAD* and *Windows* tests. Upgrading the processor is a simple matter of dropping a new DX2-66 chip into the Intel universal upgrade socket; the system clock readjusts itself.

All this beautiful design does not come cheap. At $5817 on the street, the Vectra is the second most expensive system here. But if you want an upgradable machine that's particularly good for graphics work, the HP Vectra is well worth checking out.

IBM PS/2 Model 95 XP 486DX2-50

★★½ **PROS:** Room for expansion, easy accessibility, 4GB hard disk option
CONS: Most expensive system in review, only average performance

This is far and away the most expensive system here—at $9897 on the street, it's nearly five times the price of the cheapest system. So what does Big Blue give you for all that green? Pretty much what you'd expect from an IBM server: intelligent design and lots of room for expansion. The cushioned side-panel door swings open to give you access to the seven drive bays and six open 32-bit MCA expansion slots. The processor, XGA video, and disk controller are all on easy-to-swap-out cards, and you can upgrade the proprietary hard drive to an imposing 4GB.

What you don't get for your money is top performance. The Model 95 sits solidly in the middle of the pack on our benchmarks, slower than several ISA machines. If you're looking for a file server with the IBM brand name, the Model 95 is obviously worth considering. Otherwise, you can find far better performance for far fewer dollars.

The IBM Model 95 costs nearly $10,000 but has the expansion room you need for a server.

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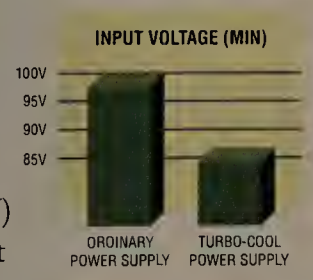

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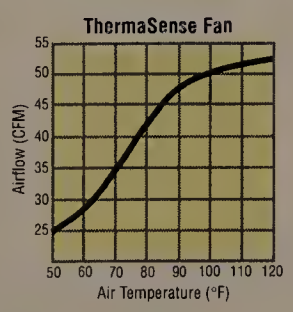
Turbo-Cool's superior independent-regulation design keeps output voltage tolerances 20 times tighter than that of an ordinary power supply. This exceptional stability improves hard drive reliability during critical access periods.

5. ULTRA-CLEAN DC OUTPUT
A dual-stage output filter ensures that sensitive computer chips receive pure, low-ripple power.

6. PROTECTION CIRCUITRY
Our units offer the most complete protection from dangerous overvoltage, overcurrent, and short circuit conditions.

7. THERMASENSE™ COOLING FAN
The Turbo-Cool 300 features ThermaSense, our high-capacity, thermostatically-controlled, variable-speed fan. The cooling is ideal! High-performance systems operate up to 35° cooler while standard ones run as much as 75% quieter.



8. UL/CSA/TUV APPROVALS
Our high-capacity units are safety approved by not only UL, but also by Canada's CSA and Germany's strict TUV.

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Turbo-Cools are designed and tested for MTBFs of over 100,000 hours. They come with a no-hassle 2-year warranty and a 30-day money-back guarantee.

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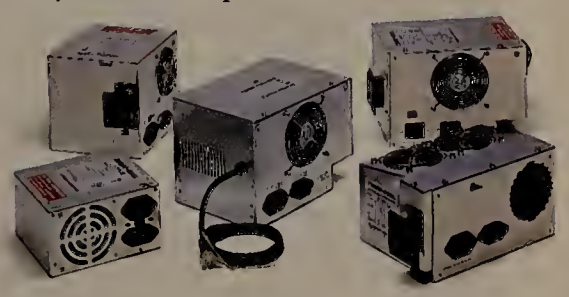
Loaded with premium features, a Turbo-Cool power supply will upgrade the performance of your PC or LAN file server at a retail cost of only 55¢ to 80¢ per watt.



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FEATURES EVALUATION

486DX2-50s: The Proof's in the Peripherals

What's it take to succeed in the DX2 race? Caching disk controllers, fast graphics processing, and an external memory cache make all the difference.

● Yes
○ No
n/o = not opplicoble

	AcerPower 486DX2-50WU	Acma 486DX2-50	ALR Flyer 32DT 4DX250 Model 200D	AST Power Premium 4/50d	Axik Ace Cache 486DX2-50	Blackship BLK 486DX2/50 EISA	Compaq Deskpro 486/50M	CompuAdd 450DX2	Compudyne 4DX2/50	Dell 486D/50
Standard features										
Street price 6/92[1]	$3960	$3495[2]	$2986	$4684[3]	$2998[4]	$3792	$3909	$3220	$1999	$3348
List price 6/92[1]	$6180	$3495[2]	$3642	$5330[3]	$2998[4]	$3792	$4767	$3220	$1999	$3348
Testing configuratian										
Bus type	ISA	ISA	ISA	EISA	ISA	EISA	EISA	ISA	ISA	ISA
Hard disk brand/size	Connor CP 30204/ 211MB	Quantum 240AT/ 244MB	Maxtor LXT 213A/ 200MB	Quantum 240AT/ 244MB	Quantum 240AT/ 244MB	Maxtor LXT 200A/ 210MB	Compaq 202MB	Western Digitol Piranho 4200/211MB	Maxtor LXT 213A/ 202MB	Quantum 240AT/ 244MB
Flappy drives	1.44MB	1.44MB,1.2MB	1.44MB	1.44MB	1.2MB, 1.44MB	1.2MB	1.44MB, 1.2MB	combo	1.2MB, 1.44MB	1.44MB
Disk cantraller brand/ cache size (MB)	UltraStor 15C 2	UltraStor 15C 4	n/a	n/o	Promise Tech DC-2032 1	AMI 1	n/o	n/o	n/o	n/o
External memary cache (K)	256	256	○	○	256	256	256	64	128	○
Graphics contraller	ATI Graphics Ultro	ATI Graphics Ultra	Western Digitol 90C30	Western Digitol 90C31	Diomond Stealth VRAM	Orchid ProDesigner IIs EISA	Compaq QVision 1024/e	CompuAdd Hi-Rez VGA	PCVA 1D	Western Digitol 90C30/31
Expandability										
Free 32-/16-/8-bit expansian slats	0/5/0	0/5/0	0/4/0	5/0/0	0/6/0	4/1/0	4/0/0	0/7/0	0/3/2	0/6/0
Accessible/internal drive bays	4/2	4/0	2/1	3/2	5/3	4/2	3/1	3/2	3/1	3/1
Chip upgrade to DX2-66/CPU card	●/○	●/●	○/●	○/●	●/○	○/○	○/●	○/○	○/○	●/○
ZIF/Weitek sackets	○/●	●/●	○/●	○/●	●/●	○/●	○/●	○/●	○/●	○/○
Fast-RAM capacity (MB)	64	64	36	80	32	64	72	64	64	64
Design and construction										
Case type/easy apen	desktnp/●	compact/●	compact/○	compact/●	tower/○	desktap/○	compact/●	desktop/○	compact/●	compact/●
Frant panel pawer switch/reset switch/ keybaard sacket	●/●/●	●/●/●	●/●/○	●/●/○	●/●/○	●/●/○	●/○/○	○/●/○	●/○/○	●/●/○
Parallel/serial/mause ports	1/2/1	1/2/1	1/2/1	1/2/1	1/2/0	1/2/0	1/2/1	1/2/0	1/2/0	1/2/1
Service and support										
Warranty (manths)	12	12	12	12	13	12	12	12	12	12
On-site service/under $100 per year	●/●	●/●	●/●	●/○	○/○	●/●	●/●	●/●	●/●	●/●
Turnaraund palicy (days)	4	7	3	7	2	2	○	○	2	3
Free unlimited suppart	○	●	●	●	●	●	●	●	●	●
Vendar suppart										
Central suppart/tall-free	○/○	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●
Daily suppart (haurs)	n/o	11	10	14	10.5	9	12	11	13	15
Weekend suppart	n/o	●	●	●	●	○	○	○	●	●
BBS/fax	●/●	●/●	●/●	●/●	●/●	○/●	●/○	●/●	●/●	●/●
Vendar-ta-dealer suppart										
Dedicated suppart staff required	○	no dealers	○	○	●	no dealers	●	●	●	no dealers
Suppart staff training required	○	no dealers	○	○	○	no dealers	●	●	●	no dealers
Dedicated suppart line far dealers	●	no dealers	●	●	○	no dealers	●	●	●	no dealers
Inventary and parts requirement	○	no dealers	○	○	●	no dealers	●	●	●	no dealers
		BEST BUY								

[1] Price includes 8MB RAM, floppy drive, hord drive os listed, VGA, color VGA monitor, mouse, Windows, ond DOS 5.0.

[2] Includes QAPlus.

[3] Includes Microsoft Works for Windows, Andrew Tobios' Monoging Your Money, ond Quicken.

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ISA	ISA	ISA	EISA	MCA	ISA	ISA	ISA	MCA	ISA	ISA	EISA	ISA	ISA
Moxtor LXT213A/ 210M8	Western Digital Caviar 2200/207MB	Quontum 240AT/ 244M8	Quontum 240AT/ 244MB	I8M 661/ 379MB	Seogote ST3283A/ 234M8	Quontum 240AT/ 244MB	Quontum 240AT/ 244MB	Quontum 240AT/ 244MB	Swon C2233/ 237MB	Quontum 240AT/ 244MB	Western Digital Piranha 2400/20BMB	Western Digitol Piranho 4200/211MB	Moxtor LXT 213A/ 202MB
1.2MB,1.44MB	1.2MB,1.44MB	1.44M8	1.44MB	2.88M8	1.2MB, 1.44M8	1.44M8	1.2M8, 1.44M8	1.44MB	combo	1.44MB	combo	1.2MB,1.44MB	1.44MB
Promise Tech DC-2031 0.5	n/a	n/o	n/o	IBM 2	n/a	n/o	n/o	I8M 0.5	n/o	n/o	Mylex 4	n/o	n/o
12B	64	○	128	○	64	128	64	○	128	○	256	256	128
Diomond Steolth VRAM	ATI Graphics Ultra	Western Digitol 90C30	HP Ultro VGA+	IBM XGA	Trident SVGA	NEC Imoge Video	Orchid Fohrenheit 12B0	C&T 82C452	Swon Direct 8us VGA	Western Digitol 90C30	Diomond Steolth VRAM	Diomond Steolth VRAM	Wyse WY-451
0/4/0	0/6/0	0/3/0	5/0/0	6/0/0	0/5/1	0/4/0	0/5/1	4/0/0	0/5/0	0/3/0	5/0/0	0/6/0	0/4/2
5/0	3/2	3/0	3/1	5/2	4/4	2/2	5/0	3/2	3/1	3/0	5/2	5/1	3/1
○/○	●/●	○/○	●/○	○/●	○/○	●/○	●/○	○/●	○/●	○/○	○/○	○/○	○/○
●/●	● ●	○/○	●/○	○/○	○/●	○/○	●/●	○/●	○/●	○/○	○/●	○/●	○/●
64	64	32	64	64	32	36	32	128	64	32	128	96	32
compact/○	desktop/●	compact/●	desktop/●	tower/●	tower/○	desktop/●	compact/○	compact/●	desktop/○	compact/○	tower/○	desktop/○	desktop/○
○/●/○	● ● ●	●/●/○	●/●/○	●/○/○	●/●/○	●/○/●	○/●/○	●/●/○	○/●/○	●/●/○	●/●/○	●/●/○	○/●/○
1/2/0	1/2/0	1/2/1	1/2/1	1/1/1	1/2/0	1/1/1	1/2/0	2/2/1	1/2/0	1/2/1	1/2/0	1/2/0	1/2/0
12	12	12	12	12	12	12	12	12	24	12	12	12	12
●/●	● ●	○/○	●/●	○/○	○/○	●/○	●/●	●/●	●/●	●/○	●/●	●/●	●/●
2	2	○	○	○	2	2	3	2	n/o	2	3	2	3
●	●	●	○	n/o	●	●	●	●	●	●	●	●	●
●/●	● ●	●/●	●/●	○/○	●/●	●/●	●/●	●/●	●/●	●/○	●/●	●/●	●/●
9	18	11	13	n/o	15	9.5	24	12	12	11	9	24	8
●	●	○	○	n/o	●	○	●	○	●	●	○	●	○
○/●	●/●	●/○	●/●	○/○	○/●	●/●	●/●	●/●	●/●	●/●	●/●	○/●	●/●
no dealers	no dealers	no dealers	●	●	no dealers	●	no dealers	●	no dealers	○	no dealers	no dealers	no dealers
no dealers	no dealers	no dealers	●	●	no dealers	●	no dealers	●	no dealers	○	no dealers	no dealers	no dealers
no dealers	no dealers	no dealers	●	●	no dealers	●	no dealers	●	no dealers	●	no dealers	no dealers	no dealers
no dealers	no dealers	no dealers	○	●	no dealers	●	no dealers	○	no dealers	○	no dealers	no dealers	no dealers

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Insight 486DX2-50

★★ **PROS:** Second lowest price in review, eight drive bays
CONS: Slow Windows performance, unaccelerated graphics

The Insight 486DX2-50 is a big handsome tower PC, with an art deco–style front panel and intelligently laid-out innards. The machine comes with a whopping six free expansion slots and eight drive bays (one already claimed by a fast Seagate hard drive). What's even nicer is this stylish tower's rock-bottom price: at $2377 on the street, it's the second least expensive system here.

Sad to say, smart design does not necessarily mean smart performance. Overall, the Insight performed only adequately on our speed tests, and it was the slowest system on our *Windows* benchmark. Chief suspect: the plain vanilla SVGA controller. But adding a third-party graphics accelerator will improve graphics performance, and the combination will still cost less than most other machines in this review. That possibility makes the Insight well worth considering.

The Insight tower is both roomy and inexpensive—but it's also fairly slow.

If you can afford it and can live with limited storage, the NEC PowerMate is a nice compact system.

NEC PowerMate 486/50i

★★ **PROS:** Upgradable to DX2-66, easy-open case
CONS: Expensive, low storage capacity

The NEC PowerMate is ingeniously designed. Inside the small, sturdy case, you'll find NEC's own local-bus Image Video and I/O functions integrated right on the system board. The NEC has a jumpered clock, which means you can swap your DX2-50 processor for the 66-MHz model without any problem. At its current 50 MHz, however, the PowerMate is an average performer in a pretty fast field.

On the downside, the PowerMate may not have enough storage for power users. The small case has only four drive bays (a Quantum hard drive in one of them) and four free 16-bit slots. Also, the PowerMate's $4852 street price is on the high side, though it does include a 15-inch NEC 4FG monitor—one of the nicest displays out there. If you want a compact DX2, have the money, and don't mind limited expandability, the NEC is one of the more attractive systems here.

Northgate Elegance ZXP-DX2-50

★★ **PROS:** Upgradable to DX2-66, good expandability for a compact
CONS: Slow

Northgate ads have been boasting about expandability lately, and the Elegance ZXP-DX2-50 backs up that claim. For a compact system, this machine has a surprising amount of room inside. The system case has six free expansion slots, five externally accessible drive bays, and an open Weitek coprocessor socket. The processor is in a ZIF socket, and the system clock can go from 25 MHz to 33 MHz with the change of a jumper, so upgrading to the DX2-66 is a simple matter.

On the downside, the Elegance's performance leaves a bit to be desired. It was particularly sluggish on *1-2-3*, and though equipped with an Orchid accelerator card, it was actually slower than the average system on our *Windows* benchmark. Still, for a reasonable $3299 on the street and backed by great customer service, the Northgate Elegance is a good compact system with room to grow.

The Northgate Elegance ZXP can be upgraded to a DX2-66 and has plenty of room for growth.

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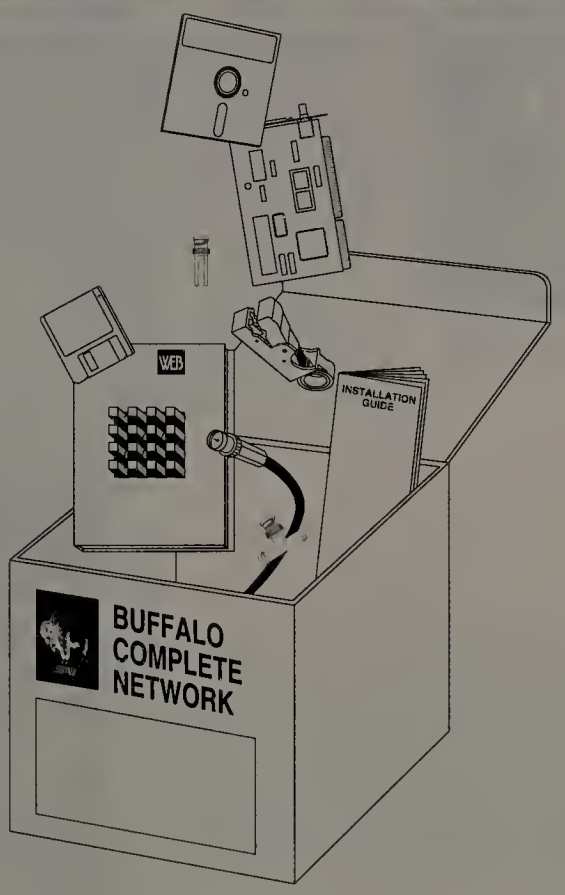

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Reply Model 32 486DX2/50

★★ **PROS:** 32-bit Micro Channel architecture, easy accessibility, half the cost of IBM, excellent support **CONS:** Slow, expensive compared to non-MCA systems

The Reply Model 32 has much in common with the other Micro Channel machine in this review, the IBM Model 95. Both earn high marks for design and construction: The Reply has a robust, easy-open case, a reset button up front, and top-notch documentation. As with the IBM, the Reply's processor is on an upgradable module.

There are, however, some significant differences between the two. The Reply is a compact desktop, the IBM a tower. The Reply has just four free expansion slots and five drive bays (one of them taken up by a Quantum SCSI drive) compared with IBM's six and seven. The Reply was also slower than the IBM, particularly on our *Paradox* and *1-2-3* tests. But the most important difference could be price. At $4818 on the street, the Reply is not exactly cheap, but it still costs less than half as much as the IBM—making it an affordable alternative to the PS/2.

If you want a Micro Channel machine, the Reply is an affordable alternative to IBM.

Despite Swan's Direct Bus graphics, the DX2-50DB did not do well on our speed tests.

Swan 486DX2-50DB

★★ **PROS:** Direct Bus video, combo floppy drive, software bundle for home users
CONS: Slowest machine in review

Swan claims the accelerated, 32-bit Direct Bus video in its 486DX2-50DB will make *Windows* run 20 times faster than regular super VGA. Unfortunately, when the rubber met the road in our lab, this particular machine blew a tire—overall, it was the slowest system tested. Despite fancy graphics, a 128K RAM cache, and a pretty zippy hard drive, it was near last on *AutoCAD* and dead last by a wide margin running *1-2-3*.

If its performance were perkier, this would be an attractive system. The design incorporates a space-saving combination floppy drive and a front panel reset switch. Access is good, and you get a nice selection of slots and open bays. Also, for your $3755, Swan throws in copies of *Microsoft Works*, *Quicken*, and *WealthBuilder* as well as a two-year warranty. Though the price and software might be attractive to home users, you could do better for a high-performance business machine.

Tandy 4850 EP

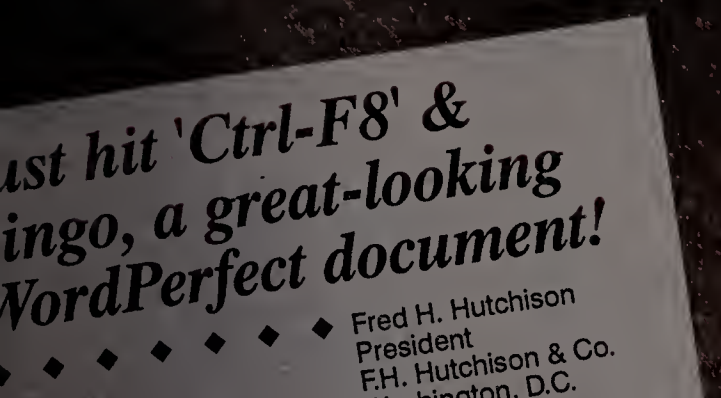
★★½ **PROS:** Slim-line case, easy accessibility
CONS: Slow, little expandability

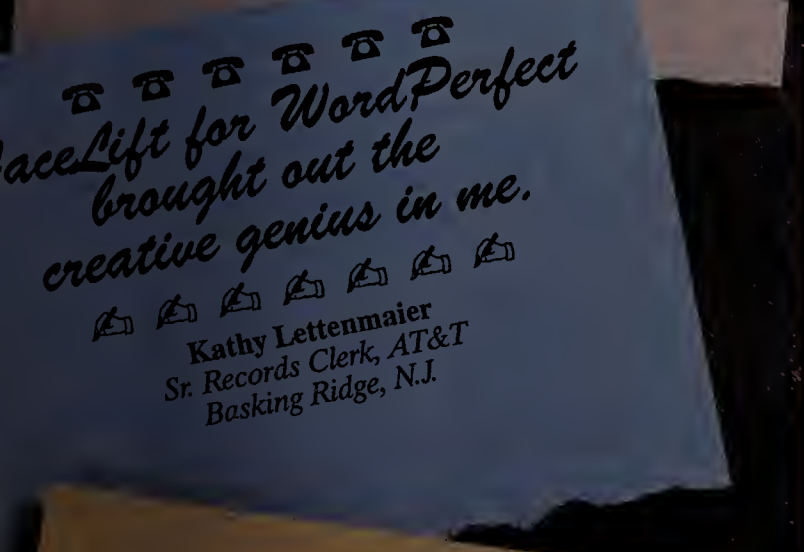
There are two differences between the roughly identical Tandy 4850 EP and Grid MFP/450. The first is minor: To get inside the Tandy, you must completely remove the back panel screws to open the case, while the Grid uses thumbscrews. The second difference is more significant: At a still-pricey $4248 on the street, the Tandy is about $500 cheaper than the Grid.

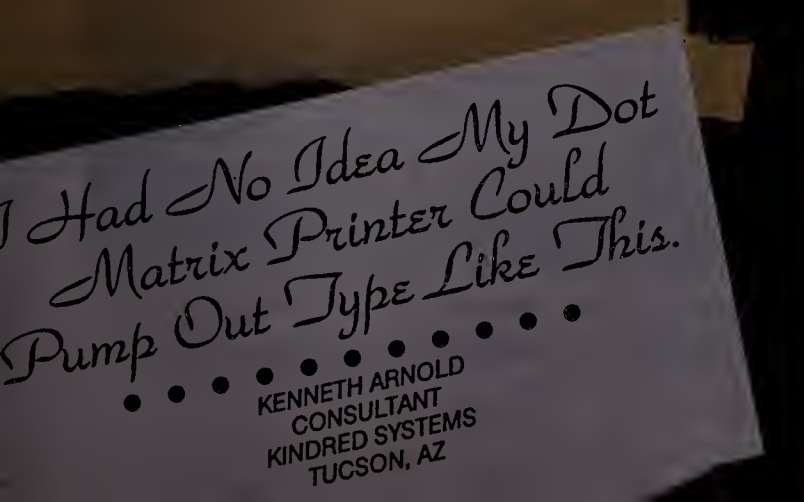
Otherwise the machines are almost exactly alike. Both machines have the same slim-line case, inside which you'll find the same Quantum hard drive. Swing out the hard drive and the power supply, and you'll find the same three expansion slots, three drive bays, and Western Digital graphics controller. Run the systems through some performance tests, and they will produce the same slow numbers. As a result, our advice on the Tandy is the same as it was for the Grid: Even if all you want is a DX2 in a compact case, these systems are identically iffy buys.

Like the virtually identical Grid MFP/450, the Tandy 4850 EP is small but slow.

Bitstream Invites You To Take The FaceLift For WordPerfect Challenge.







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After all, who'd resist a utility that gives you 16 award-winning Bitstream® typefaces in 2-500 point sizes by simply pressing 'Ctrl-F8' in WordPerfect? Who'd pass up the chance to instantly produce top-quality type from almost any LaserJet,® dot matrix or inkjet printer? Who'd miss out on all this, knowing that FaceLift 1.5 for WordPerfect needs just a fraction of your hard disk space, and takes only 10 minutes to install?

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Formal Script 421
Park Avenue™
Brush Script™
188 ITC Zapf Dingbats®
☆✂✈✇✓☛✗✐➪❶❷❦✆
150 Symbols Monospaced
ΑΒΧΔΕΦΓαβχδεφγ123⊕ΥΩ
150 Symbols Proportional
ΑΒΧΔΕΦΓαβχδεφγ123⊕ΥΩ

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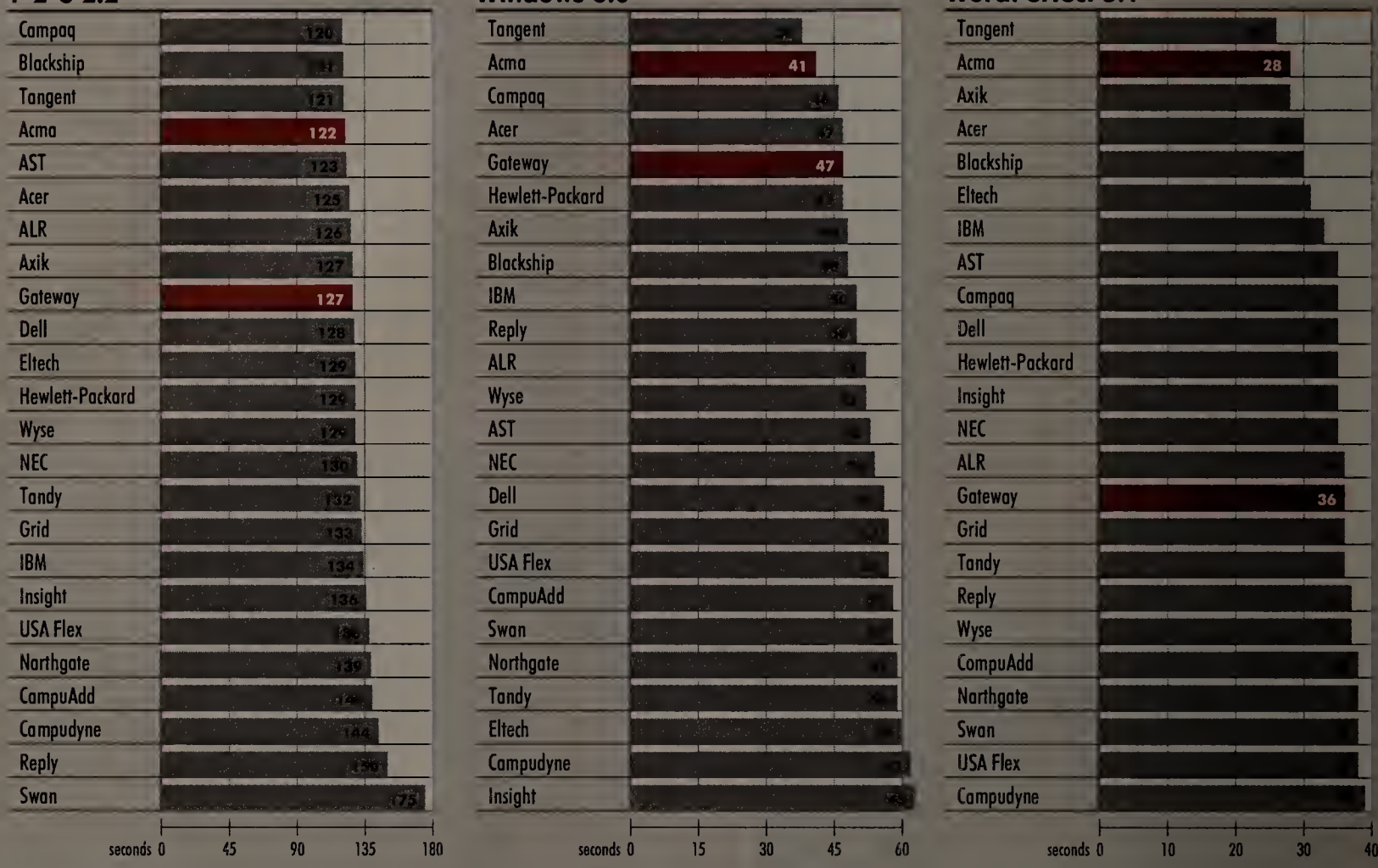
Circle 41 on reader service card

PC WORLD TEST REPORT

50-MHz 486DX2s: Hold On to Your Seats!

BEST BUY



Methodology
We tested all the computers with 8MB RAM and hard disks from 200MB to 244MB, except the IBM PS/2 Model 95 XP 486DX2-50, which had a 380MB hard disk. We used DOS 5.0.

1-2-3 2.2
We load the application, followed by three separate worksheets (arithmetic, financial, and scientific). We make various changes and run recalcs on each. Finally, we use the *MAPS* add-in from Management Advisory Services of Seattle to run a number of financial forecasts.

Windows 3.0
Timing begins and ends at the DOS prompt. We launch *Windows* along with a macro that loads *Microsoft Excel* with a financial worksheet and initiates a recalc. Then the macro loads Lotus's *Ami Pro* along with a 50K document that contains a 500K TIFF image. Finally, the macro launches *Micrografx Designer*, opens a drawing, displays it on screen, and exits to DOS.

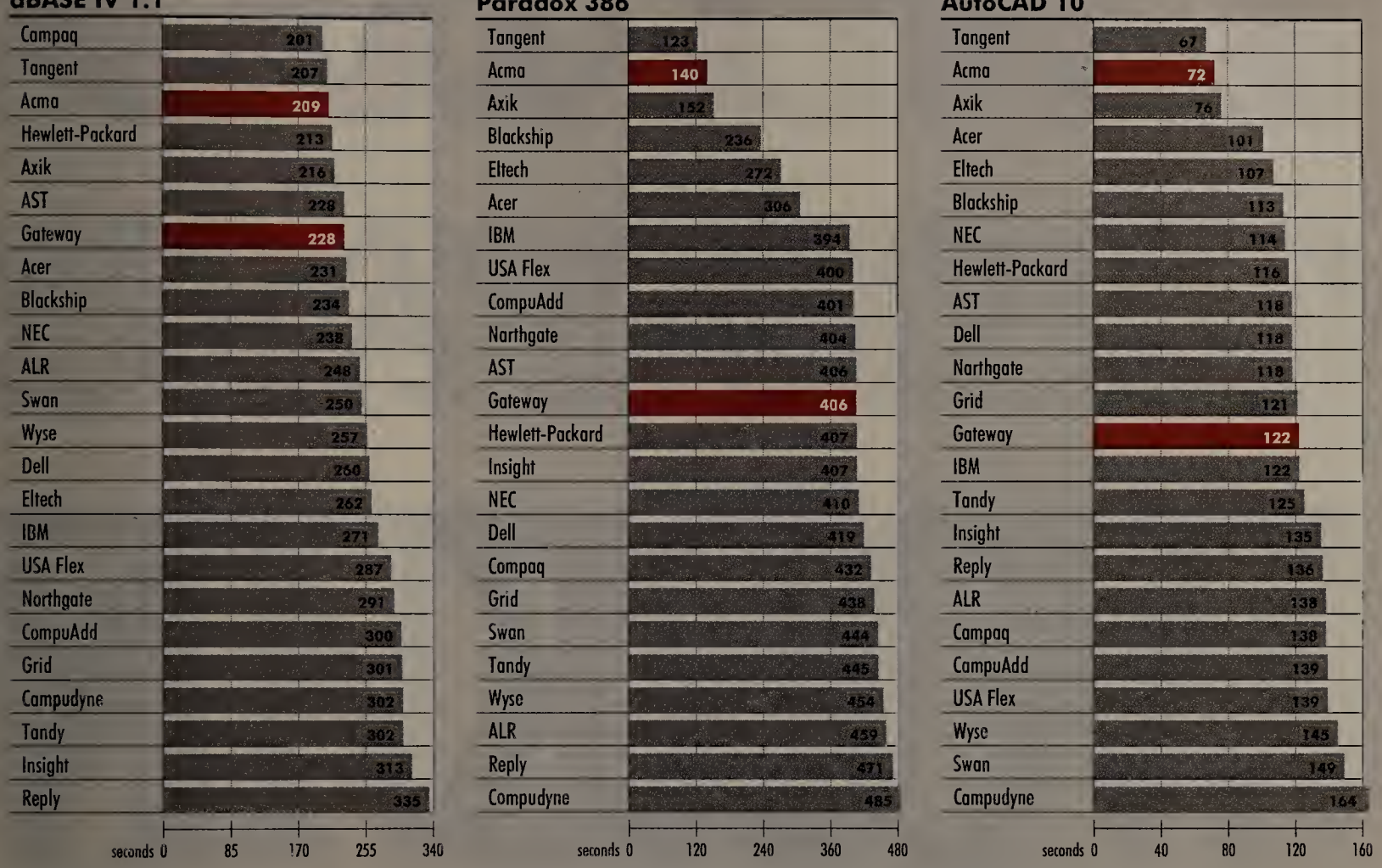
Tangent Model 450ex

★★½ **PROS:** Fastest machine in review, excellent customer support
CONS: Expensive

Let's cut to the chase: The Tangent Model 450ex is one of the fastest business PCs we've ever reviewed. This system came in first on *Windows*, *WordPerfect*, *Paradox*, and *AutoCAD*, a microscopically close second on *dBASE*, and its second-place time on *1-2-3* was an insignificant 1 percent slower than the leader's.

You don't have to go far to figure out why it's so fast. This EISA tower comes loaded with a Mylex caching disk controller filled with 4MB of cache, a Western Digital SCSI drive, a generous 256K external RAM cache, and a Diamond graphics accelerator. The system also gives you seven drive bays and such nice touches as a combo floppy drive and a front panel reset switch. So what's not to like? The $4585 price tag. If this system were a little cheaper, it would be an easy choice for Best Buy. As it is, if you want speed, the Tangent is the system for you.

The screamingly fast Tangent Model 450ex is loaded with performance-enhancing peripherals.



WordPerfect 5.1
We reformot three *WordPerfect* documents thot vory in size from 5K to 55K. The files contain some boldfoce ond underlining; one document includes a TIFF file.

dBASE IV 1.1
With coching enobled, we complete on unindexed search far a single recard in a 100,000-record ports table. Then we index the toble, run the tronsoction processing madule, ond post 600 records.

Paradox 386
Storting with an orders table, we compore eoch record with on avoilable stock toble. The opplicotion finds the current price far the items and inserts the resulting recard into on invaice table.

AutoCAD 10
We laod o 500K drawing. We then mask layers, chonge zooms, ond remove the hidden lines.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

USA Flex 486/DX2 50MHz

★★★ **PROS:** Low price, room for expansion, greot customer service
CONS: Slow, poor internal loyout

At $2649 on the street, the USA Flex 486/DX2 is one of the least expensive systems here. But despite the low price, it doesn't skimp on features. The system came with a fast Western Digital hard drive, one of the ubiquitous Diamond Stealth graphics controllers, and a 256K write-back RAM cache. The system also has plenty of room for expansion, with six free 8/16-bit slots, plus five external drive bays and one internal.

Unfortunately, the machine feels and performs more like a collection of components than an integrally designed system. It's not as accessible as some machines—components cover each other up, drive bays are tucked away in odd corners—and documentation is scanty. Also, despite the RAM cache and accelerated graphics, the USA Flex was unimpressive on our benchmark tests. Still, for the low price, the system should appeal to budget-conscious buyers who don't need top speed.

The USA Flex 486/DX2 might appeal to buyers who are willing to sacrifice performance for price.

INTRO

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Monitor and control your memory and system resources at a glance.

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Wyse Decision 486/50DX2

★★★ **PROS:** Above-average 1-2-3 and Windows performance, extremely good support **CONS:** Expensive for limited feature set

The Wyse Decision is no bargain. What's surprising is that for $3970 on the street, you don't get a caching disk controller or accelerated graphics. In fact, the proprietary Wyse graphics controller, which comes with only 256K of video RAM can't handle anything fancier than 800 by 600 super VGA. Also, the biggest available hard disk is just 300MB, one of the smallest options in the roundup. Another quibble: the Num Lock, Scroll Lock, and Caps Lock indicators look just like buttons and are positioned on the keyboard as if they were.

These complaints aside, the Wyse is a good, solid system. The case is sturdy, and there are six free slots. Performance figures are squarely in the middle of the pack—above average on *1-2-3* and *Windows*, slower on *AutoCAD* and *Paradox*. Service and support are excellent. There's much to recommend the Decision—if only its price were a little lower.

For nearly $4000 on the street, you might expect more than the Wyse delivers.

WHERE TO BUY

AcerPower 486DX2-50WU
Acer America Corp.
2641 Orchard Pkwy.
San Jose, CA 95134
800/421-2844,
408/432-6200
Reader service no. 657

Acma 486DX2-50
Acma Computers, Inc.
48501 Warm Springs Blvd.
Fremont, CA 94539
800/786-6888,
510/623-1212
Reader service no. 658

ALR Flyer 32DT 4DX250 Model 200D
Advanced Logic Research, Inc.
9401 Jeronimo
Irvine, CA 92718
800/444-4257,
714/581-6770
Reader service no. 659

AST Power Premium 4/50d
AST Research Inc.
16215 Alton Pkwy.
Irvine, CA 92713-9658
800/876-4278,
714/727-4141
Reader service no. 660

Axik Ace Cache 486DX2-50
Axik Computer, Inc.
1031 E. Duane Ave., Ste. F
Sunnyvale, CA 94086
800/234-2945,
408/735-1234
Reader service no. 661

Blackship BLK 486DX2/50 EISA
Blackship Computer Systems, Inc.
2031 O'Toole Ave.
San Jose, CA 95131
800/531-7447,
408/432-7500
Reader service no.662

Compaq Deskpro 486/50M
Compaq Computer Corp.
P.O. Box 692000
Houston, TX 77069-2000
800/345-1518,
713/370-0670
Reader service no. 663

CompuAdd 450DX2
CompuAdd Computer Corp.
12303 Technology Blvd.
Austin, TX 78727
800/627-1967,
512/250-1489
Reader service no. 664

Compudyne 4DX2/50
Compudyne Products
15151A Surveyor Blvd.
Addison, TX 75244
800/932-2667,
214/702-5600
Reader service no. 665

Dell 486D/50
Dell Computer Corp.
9505 Arboretum Blvd.
Austin, TX 78759
800/289-3355,
512/338-4400
Reader service no. 666

Eltech 4500DX2
Eltech Research
47266 Benicia St.
Fremont, CA 94538
800/358-8330,
510/438-0663 (fax)
Reader service no. 667

Gateway 2000 50MHz 486DX2
Gateway 2000
610 Gateway Dr.
N. Sioux City, SD 57049
800/523-2000,
605/232-2000
Reader service no. 668

Grid MFP/450
Grid Systems Corp.
47211 Lakeview Blvd.
Fremont, CA 94537
800/222-4743,
510/656-4700
Reader service no. 669

Hewlett-Packard Vectra 486/50U PC
Hewlett-Packard Co.
974 E. Arques Ave.
Sunnyvale, CA 94086
800/752-0900
Reader service no. 670

IBM PS/2 Model 95 XP 486DX2-50
IBM
800/426-9292,
800/465-7999
(Canada)

Insight 486DX2-50
Insight
1912 W. Fourth St.
Tempe, AZ 85281
800/755-9628,
602/350-1176
Reader service no. 671

NEC PowerMate 486/50i
NEC Technologies, Inc.
1414 Massachusetts Ave.
Boxborough, MA 01719
800/388-8888,
508/264-8000
Reader service no. 672

Northgate Elegance ZXP-DX2-50
Northgate Computer Systems, Inc.
7075 Flying Cloud Dr.
Eden Prairie, MN 55344
800/548-1993,
612/943-8181
Reader service no. 673

Reply Model 32 486DX2/50
Reply Corp.
4435 Fortran Dr.
San Jose, CA 95134
800/955-5295,
408/942-4804
Reader service no. 674

Swan 486DX2-50DB
Swan Technologies
3075 Research Dr.
State College, PA 16801
800/468-9044,
814/238-1820
Reader service no. 675

Tandy 4850 EP
Tandy Corp.
Contact a local Radio Shack store or dealer
Reader service no. 676

Tangent Model 450ex
Tangent Computer, Inc.
197 Airport Blvd.
Burlingame, CA 94010
800/466-3300,
415/342-9388
Reader service no. 677

USA Flex 486/DX2 50MHz
USA Flex
471 Brighton Dr.
Bloomingdale, IL 60108
800/758-3539,
708/351-7204 (fax)
Reader service no. 678

Wyse Decision 486/50DX2
Wyse Technology Inc.
3471 N. First St.
San Jose, CA 95134
800/438-9973,
408/473-1200
Reader service no. 679

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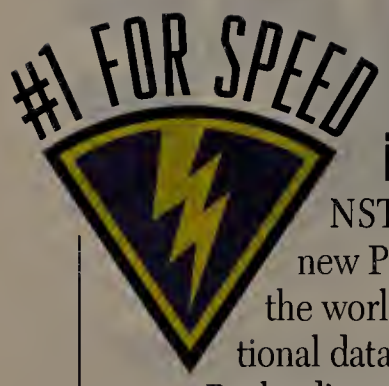

Paradox is fastest

NSTL results prove new Paradox® 4.0 is the world's fastest relational database! Thanks to Borland's new WarpSpeed™ performance, Paradox 4.0 sets the standard in performance for both network and standalone use. For you, this means faster answers to queries, faster memory access and faster multiuser applications.

In fact, Paradox 4.0 gives you unparalleled performance throughout all aspects of database management and application development. As NSTL put it, "Paradox is clearly the best all-around product evaluated." It beats FoxPro hands down.

Software Digest's *NSTL report rates Paradox highest of all databases tested in Overall Power and Performance.*

New Windows-like interface

Our new Windows-like interface makes using Paradox 4.0 more intuitive than any other database. Context-sensitive SpeedBar™ controls give you instant access to your frequently used commands and features. Movable, resizable windows, pull-down menus and mouse support make creating and editing your database simple. And new dialog boxes give you the choices you need in one place, saving time and effort.

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Paradox pioneered Query By Example (QBE), the easiest way to get answers from your database. Now, a built-in query optimizer enhances QBE, automatically finding the fastest path to the answers you're seeking. Plus, multi-table forms and reports make everything from data entry to presentations a snap—all without programming.

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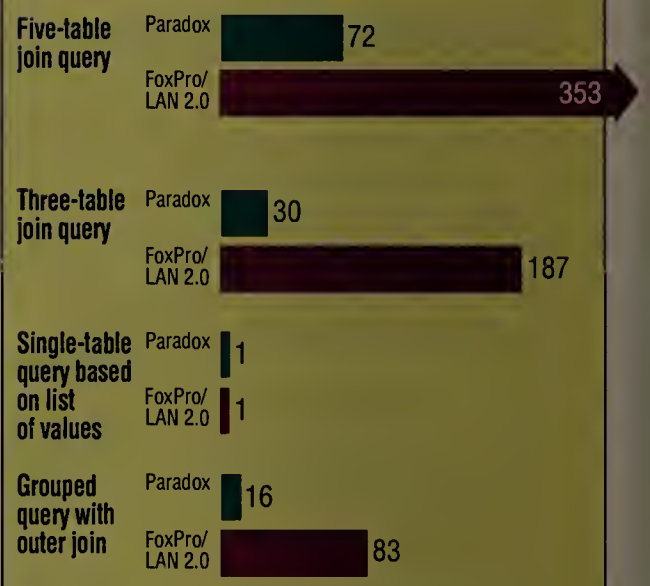
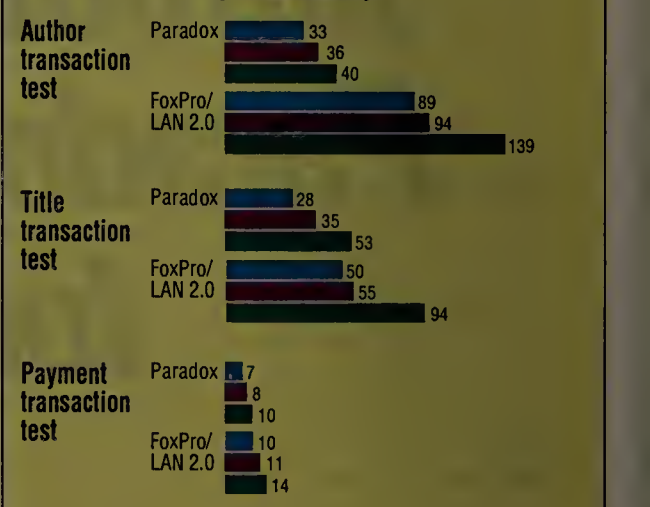
WarpSpeed stands for Wildly Accelerated Relational Performance. It reflects Borland's commitment to performance, and is also an integral part of our dBASE® and InterBase™ development programs.

NSTL tests confirm Paradox 4.0: Quicker than a Fox

Single-user performance tests
(in seconds)



Multiuser performance tests
(in seconds)



Multiuser Legend:
1 station **3 stations** **8 stations**

To test the speed of transaction performance, NSTL designed a database for book order entry. Each record contained an author, a title, an ISBN number, a price and inventory information. The database contained 25,000 books and 5,000 authors.

PARADOX

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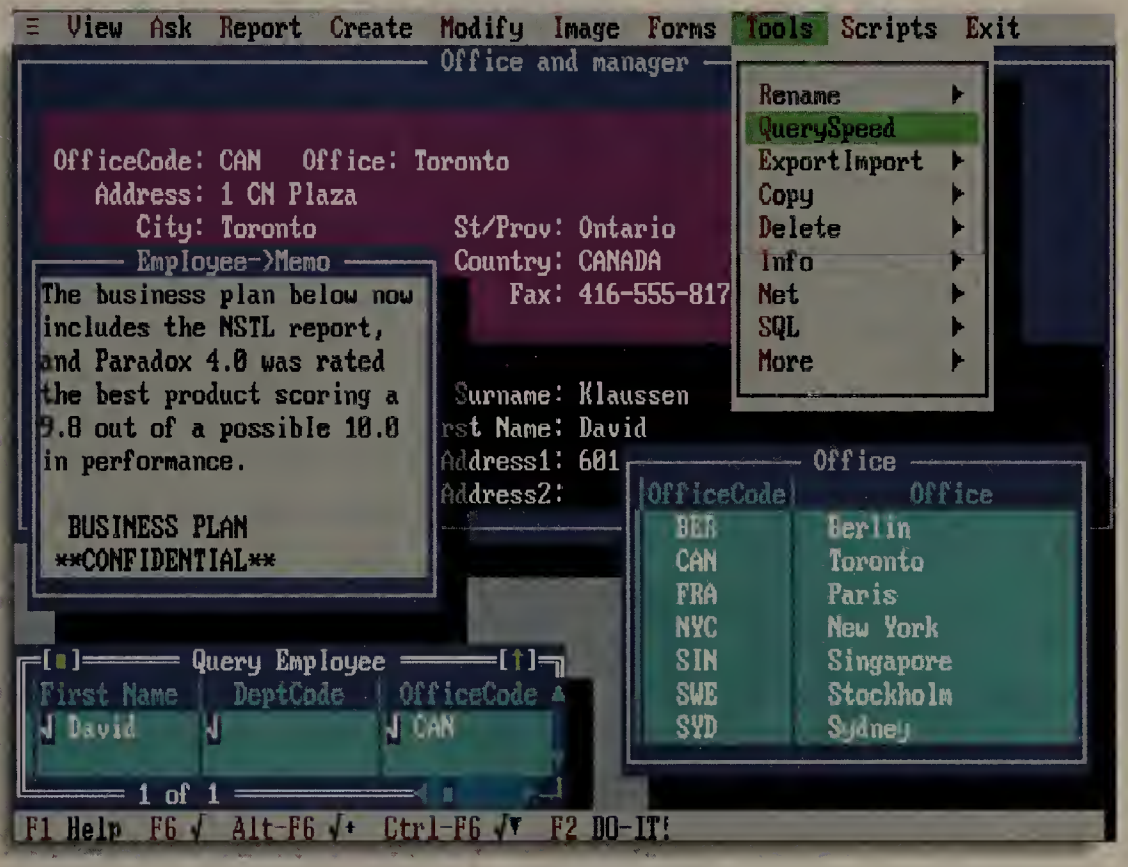
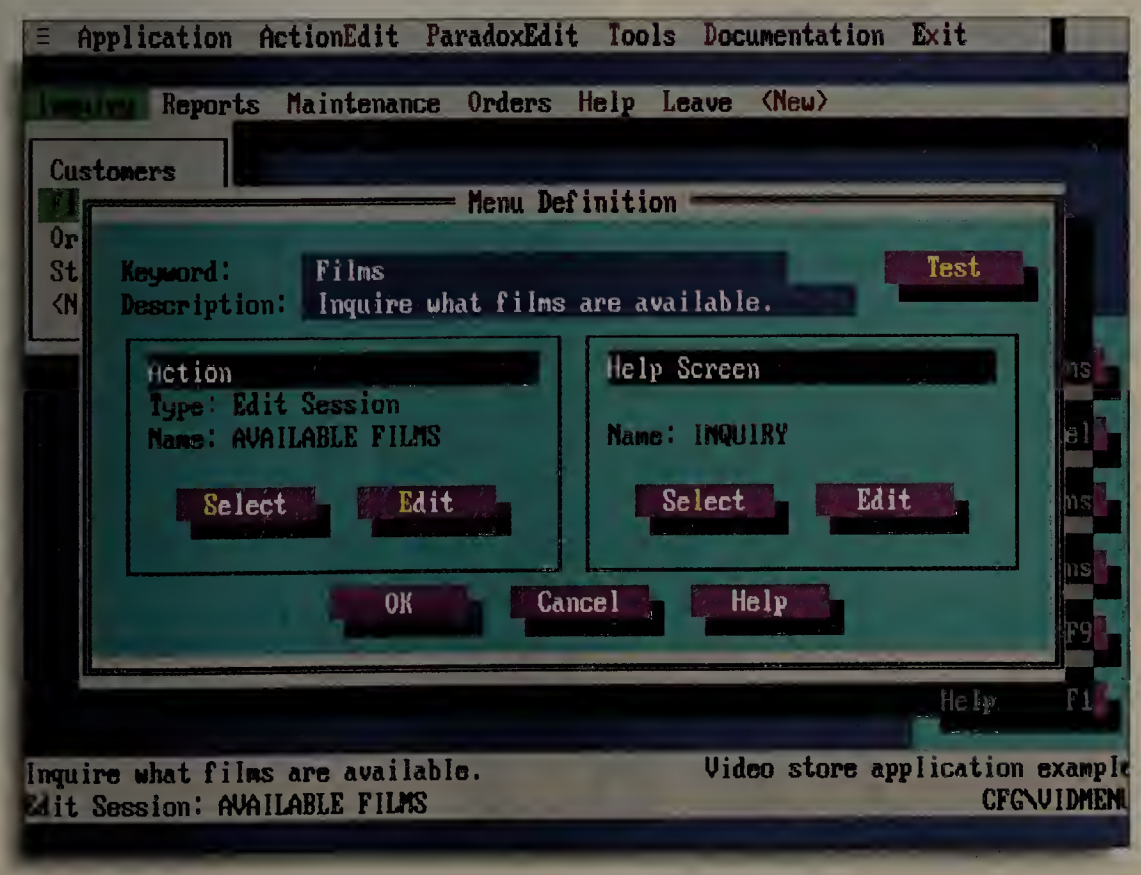
Paradox 4.0 gives you the power to manipulate data you couldn't manage with ordinary databases. With new variable length memo fields, you have the ability to effortlessly manage large amounts of text information throughout your applications. And you can store anything you want in the new binary field—word processor documents, sound, bitmapped graphics, multimedia data—and then manipulate it under program control. Each can hold up to 256Mb of data per field—up to 4 gigabytes per table! There's no easier way to manage large applications.





With the new Applications Workshop, you can build complete applications that include pull-down menus, mouse support, transparent multiuser edit sessions and more. Best of all, it's simple!

Efficient memory management

Paradox 4.0 gives you the best way to manage memory. VROOMM™ with Turbo Drive™ provides more available memory and more efficient memory utilization. So Paradox 4.0 runs on any 286 PC or above. In addition, Paradox 4.0 can run as a DOS application under the Microsoft® Windows operating environment, thanks to complete DPMI support.

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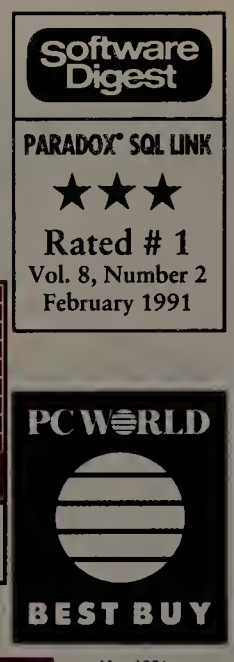
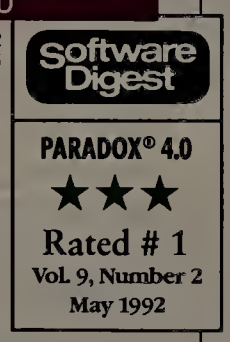
DEMAND

The most award-winning database

Since its introduction, Paradox has won more awards for technical excellence and customer satisfaction than *any* other database. Awards from every major computer magazine and periodical from around the world. In addition, in the J.D. Power and Associates® survey,* Borland ranked as the #1 (tied) Application Software Publisher in Customer Satisfaction Among Business Users. All of which has made Paradox the favorite of users and developers alike.





Faster network performance

Paradox 4.0 is the fastest multiuser network PC database ever. And it's network-ready right out of the box. Multiple users can read, write and modify data simultaneously. You get all this, plus new automatic group lock security that allows multiple users to share data flexibly, providing dramatically increased performance. Just another reason Paradox 4.0 is the best investment for your business.

Transparent access to SQL data

With Paradox SQL Link (sold separately), you can seamlessly access remote SQL data. You can then work with this data using standard Paradox features such as Query By Example. Paradox does all the translation for you.

Paradox SQL Link completely shields you from the intricacies of PC and database server communications. When you specify an SQL table operation, Paradox SQL Link automatically selects the correct communications protocol, opens up

Paradox Developer's Corner

Powerful, procedural language

The Paradox Application Language (PAL™) lets you create sophisticated Paradox applications quickly. PAL procedures allow for private and global variables, array passing and variable scoping. Paradox 4.0 includes more than 90 new commands and functions.

Powerful UI controls

Easily construct your applications with a robust look and feel using the built-in UI controls: non-modal pull-down menus, dialog boxes (with push buttons, check boxes, radio buttons, pick lists, type-in lines and more), pop-up menus, mouse support and multiple overlapping windows.

Event-driven extensions

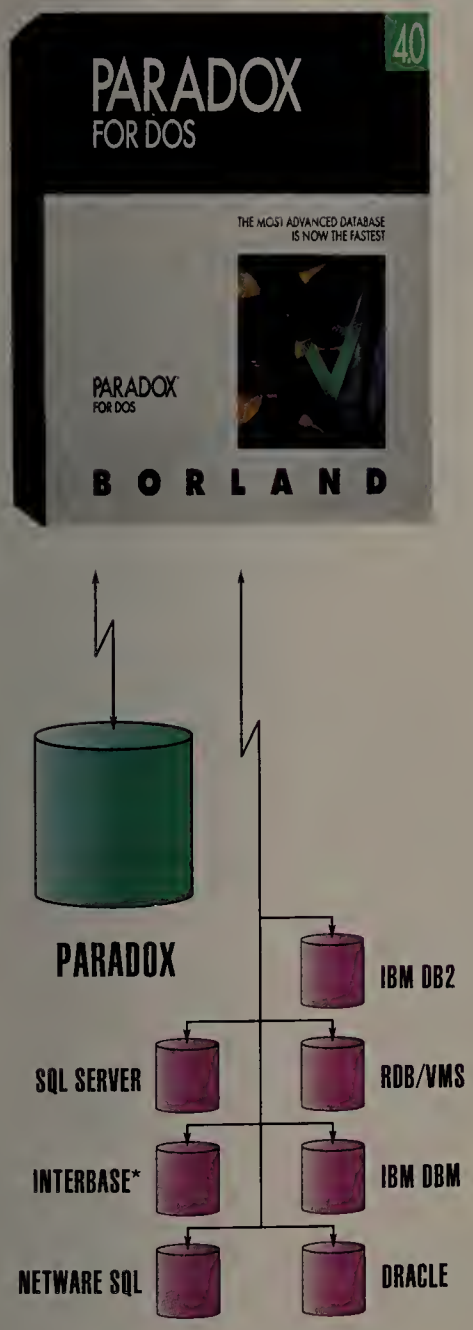
GetEvent() passes keyboard, mouse and/or system events into your procedures for dispatching. Use dynamic arrays to pass dynamically created data structures to procedures. This greatly increases the modularity and reusability of your code.

Leverage Paradox behavior

Build on Paradox's multiuser support for automatic locking, multi-table forms and referential integrity. Define special error-handling procedures to trap and process error conditions, giving you complete flexibility over users' interaction with your custom application.

*1991 J D. Power and Associates 1991 Computer End User Satisfaction Study for Software Publisher: Phase IV: Business End User Summary. Responses from Business End Users at 4,396 business sites. Copyright © 1992 Borland International, Inc. All rights reserved. All Borland product names are trademarks of Borland International, Inc. Microsoft is a registered trademark of Microsoft Corporation. *Software Digest* is a registered trademark of NSTL, Inc. *Software Digest* Rating Report, Multiuser Database Programs, May 1992, Vol. 9, No. 2. BI 1461

BORLAND



*Paradox SQL Link supports more industry-standard database servers than any other PC database available. (*And the InterBase SQL connection will be available soon.)*

a communication link, relays statements to the database server and presents the results of your query.

By using Paradox SQL Link, you can now enjoy the benefits of SQL databases without the difficulty of mastering the SQL programming language. In addition, Paradox SQL Link operations follow database server security restrictions.

Borland—the database leader

Borland is the acknowledged leader in PC relational databases. More users and developers trust their data to Borland products than any other company. And an integral part of that trust is Paradox.

Paradox 4.0's power to create and manage sophisticated applications, maintain data integrity, handle large quantities of data, perform complex database operations and connect to corporate data is critical to the success of a database management system today. No other PC database meets this challenge like Paradox 4.0—the most advanced database. Best of all, with Paradox 4.0's 60-day, money-back guarantee, you can order risk-free today. So demand the best. Demand Paradox!

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Canadian customers call 1-800-461-3327.

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POINT-AND-CLICK ACCOUNTING SOFTWARE

TRACKING YOUR COMPANY'S FINANCES DOESN'T HAVE TO BE DRUDGERY. WITH ONE OF THESE NINE GRAPHICAL DOS AND WINDOWS PACKAGES, YOU CAN EASE BOOKKEEPING CHORES AND ENJOY INSTANT ACCESS TO TIMELY FINANCIAL INFORMATION.

BY RICHARD MOROCHOVE

If you're like most small-business owners, you'd rather spend time making money than counting it. But financial records—tedious as they may be—are how businesses keep score. Even if you're not interested in detailed financial statements, the IRS, your bank, and other creditors are.

If you're ready to trade in your pen and ledger for a keyboard and disk, read this review of nine accounting packages. These programs ease the burden of tallying your bottom line so you can get on with your business. The *Windows* packages are mostly in their second generation and are beginning to take better advantage of the *Windows* interface, including a richer set of accounting functions. Not to be left behind, some of the DOS packages are moving from electronic versions of double-entry ledgers and audit trails to more innovative approaches that give you an up-to-the-minute view of your finances.

Although their approaches vary considerably, all these packages are designed for small businesses—companies with annual sales of $5 million or less and up to 20 employees. They all do a great job of handling the basics: sending invoices to customers, paying suppliers, and preparing financial statements so that both you and your accountant know where things stand. Many of the packages also provide inventory and

ILLUSTRATION BY TOM GARRETT

payroll functions, often without any extra cost. Some even have contact management features that can help organize your workday. And at under $250, they are all affordably priced.

We evaluated these packages by looking at the day-to-day demands of a small business and developing task-oriented tests based on setting up the books, tracking revenue, managing expenditures, financial recording, and preparing financial reports.

Our tests were designed not only to determine if a package could support a particular feature or function but also to assess how easily you were able to get from point A to point B.

We installed the software and set up

Buying Smart: Picking the Package That's Right for You

Many accounting packages wind up as "shelfware," gathering dust because they're too difficult to use or are poorly suited to the needs of the business. Knowing what's important is the key to picking the right package. Here's what to look for when making the foray into computerized accounting.

EASE OF USE

No one finds accounting a snap, but a well-designed graphical accounting program can ease the pain of setting up books and managing finances. Look for logically grouped commands and mnemonic keyboard shortcuts. A good, well-indexed manual and an introduction to accounting fundamentals can go a long way toward demystifying bookkeeping. Many of the programs reviewed here eschew accounting jargon for plain English. While this may not please your accountant, it's easier for nonaccountants to understand.

All the programs have on-line help, although the quality varies considerably. *QuickBooks* features a QuickTrainer window that pops up with useful information whenever you hesitate. *Peachtree Accounting* has virtually the complete manual on line.

SETTING UP BOOKS

Your first hurdle will be entering all your company's financial data into the accounting system—historically a cumbersome and not altogether intuitive task. To minimize your frustration, look for a good selection of sample charts of accounts and flexible fiscal periods. Most accounting programs come with a few preset, empty charts of accounts that make this job easier. The more predesigned charts included, the better your chance of finding one that matches your needs.

If your company uses the 12 calendar months as your fiscal periods, you'll have no trouble with any of these programs. Having more periods can be useful in some circumstances, however. For example, some retailers prefer to use 13 periods of exactly four weeks each, or even 52 weekly periods to better monitor their selling cycle. Check to see that the program you're considering gives you enough flexibility in this area.

Most companies use the accrual basis of accounting, which recognizes profit when the invoice goes out to the customer. Cash basis accounting recognizes profit when you receive customer payments. This method is simpler, but check with your CPA to see if it's appropriate for your business. All the programs we reviewed perform accrual accounting, and many also support cash basis.

TRACKING REVENUES

The key to continued success in any business is getting paid for work performed or goods sold. Certain features in an accounting package can help you collect on accounts. Some systems, for example, allow you to send out a series of age-dependent dunning notices to let customers know when their accounts are seriously past due. Some programs allow you to charge interest on overdue accounts or permit discounts to encourage prompt payments. Another useful feature is the capability to establish customer-specific payment terms, so you can fine-tune your billing methods to suit a variety of clientele. A program that supports recurring invoices will make your life easier when you regularly bill a fixed amount, such as a monthly maintenance charge.

Your accounting program should support as many customers as you're likely to have—at least 1000. All these packages allow you to send out invoices to customers. Some programs include standard invoices that you can customize to fit your business. Better still is the capability to create an invoice from scratch, importing a company logo or other graphic for a more professional look.

MANAGING EXPENDITURES

This part of the program tracks your expenses and lets you know how much cash you'll need to pay upcoming bills. If you can customize your checks and payment advice stubs, you aren't forced to buy high-priced forms from printers. Also check whether the package supports recurring payments to process bills that stay the same month after month, such as office rent and car payments. If your suppliers offer discounts for prompt payment, you'll want your pro-

accounts and business information for a new company. To track revenues, we tested how competently a program set up customer records and created invoices, including billing terms where possible. We tested each package's accounts payable functions by setting up vendor accounts and paying suppliers' bills with checks. We then set up accounts and made entries to evaluate each system's financial recording capabilities. Finally, we prepared a complete set of financial statements, including both an income statement and a balance sheet, and then we evaluated how well each program presented the information.

gram to calculate these discounts automatically so you can make the best use of outgoing cash.

Another valuable tool in managing your expenses is a cash requirements report, which predicts the money you'll need to pay out in the next month or two. This is helpful when estimating future cash needs and may give you advance notice of a cash shortage that requires an increase in your bank line of credit.

FINANCIAL RECORDING

The summarized results of your revenues and expenditures end up here. You also need to make entries that don't directly affect cash, such as the depreciation of your office furniture, plant machinery, and equipment. Better packages let you compare your actual results to a budget and keep a number of fiscal periods open. Look for a program that displays all the accounts in your journal entry at once, to help ensure that you haven't left anything out and that your entry is in balance. Equally handy are the capabilities to have a large number of ledger accounts and to segregate them into cost departments such as sales, production, and administration. These features can help in the analysis of your financial results. If you can have more than one open period, you can back-date late entries into their proper fiscal period. Nobody likes having to stick to a budget, but programs that set a budget and monitor financial results can help enforce fiscal discipline.

FINANCIAL REPORTING

Printing financial statements is what accounting is all about—at least as far as your CPA is concerned. If you can customize your statements, such as developing your own subtotals or column presentations, you and your accountant will get the reports you want.

At a minimum you'll need to have an income statement and a balance sheet. All of the programs evaluated here will prepare a balance sheet that gives you a snapshot of your company's financial position at any point in time and an income statement to show your profit or loss for the year to date.

If the program can also export financial data to a spreadsheet, your accountant will have maximum flexibility in modifying information for custom reports.

Less common but also useful are a statement of changes in financial position, which shows the cash flow of your business for the year to date, and a report that helps reconcile your checks with your bank account.

Financial trends are usually easier to identify in graphical format, so look for bar or line charts. One of the beauties of a computerized accounting system is that you can "slice" the financial pie many ways. You can get an analysis of sales by customer, product, or territory to help you pinpoint sales trends and study sales effectiveness.

SECURITY FEATURES

Since your accounting system contains sensitive information, password protection is important if more than one person will be entering data. A menu-item password system helps maintain the segregation of duties and improves the system of internal controls that your auditor is always talking about.

All the packages here provide detailed listings that, if printed and retained, will provide a sufficient audit trail for your accountant. It is also helpful if you don't purge the transaction details in your accounting data base until after the year-end work is completed.

SERVICE AND SUPPORT

When you get stuck, there's no substitute for knowledgeable help. To test technical support, we called each vendor three times and asked questions of varying complexity; we noted both the timeliness and accuracy of the answers. We also factored in support policies, such as the cost for annual technical support, hours of service, a toll-free line, and BBS and fax support.

PRICE

None of these programs sells for more than $250, but some are greater bargains than others. All the costs noted here are list prices; expect to pay 25 to 40 percent less in a store.

In most small businesses, the person responsible for managing the books isn't a qualified accountant and the bookkeeping work isn't a full-time job. It's performed only a few days each month, in between making sales calls and hiring new employees.

Fortunately, most of the programs evaluated here depart from the rituals of old-fashioned, mainframe-style accounting: You don't need to fiddle with batches; your entries immediately show up in your financial results. You also don't need to be a CPA or even understand the difference between a debit and a credit.

Five of these packages run under Windows: *Access to Platinum, Accpac Simply Accounting for Windows, M.Y.O.B. (Mind Your Own Business), Peachtree Accounting for Windows,* and *Profit Point Accounting.* The other four run under DOS: *One-Write Plus, Pacioli 2000, QuickBooks,* and *Teknon Accounting.*

From our evaluation, it's clear that these packages are rapidly changing from computerized versions of manual accounting procedures to smart, more innovative electronic tools that help businesses work more effectively with their financial figures.

Our Best Buy, *M.Y.O.B.*, is strong both in features and ease of use. The rest of the packages tend to excel in one area or the other. *Accpac Simply Accounting, QuickBooks,* and *Peachtree Accounting* are leaders in ease of use, while *Profit Point Accounting* and *Pacioli 2000* have the heavyweight feature sets.

Richard Morochove is a chartered accountant and president of Morochove & Associates, a Toronto computer consulting firm, where he advises clients on accounting software.

For more information about all products in this article, circle reader service no. 904.

EXECUTIVE SUMMARY

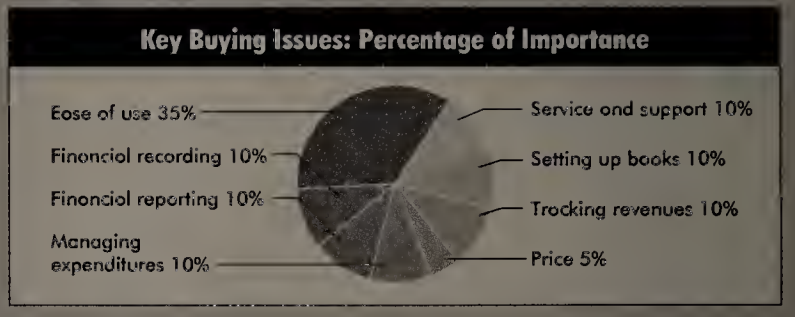
Accounting for the Rest of Us

An easy-to-use, robust accounting solution, M.Y.O.B. has all the answers for the small business.

PC WORLD BEST BUY

Some of these accounting packages excel in ease of use, particularly **QuickBooks 1.0** and **Accpac Simply Accounting 1.0L;** others sport a broad array of features. But one stands out from the competition by combining a unique, easy-to-follow design with a comprehensive set of features: **M.Y.O.B. 3.0.** In addition, **Peachtree Accounting for Windows 5.0** and **Pacioli 2000 2.0** deserve mention for their good range of features.

Key Buying Issues: Percentage of Importance



Excellent ★★★★
Good ★★★
Fair ★★
Poor ★

	Reader service number	Ease of use	Financial recording	Financial reporting	Managing expenditures	Service and support	Setting up books	Tracking revenues	Price	Overall value	
Access to Platinum 2.51	681	☆☆	☆☆☆½	☆☆½	☆☆☆	½	☆☆☆½	☆☆½	☆☆	★★½
Accpac Simply Accounting for Windows 1.0L	682	☆☆☆☆	☆☆½	☆½	☆½	☆	☆☆☆½	☆½	☆½	★★½
M.Y.O.B. 3.0	683	★★★★	★★★★	★★★	★★★	★½	★★★½	★★★	★	★★★½
One-Write Plus 3.0	684	☆☆☆	☆☆☆	☆½	☆☆	☆½	☆☆☆½	☆☆	☆☆	★★½
Pacioli 2000 2.0	685	☆☆☆	☆☆☆☆	☆☆☆	☆☆½	☆	☆☆	☆☆½	☆☆☆☆	★★★
Peachtree Accounting for Windows 5.0	686	☆☆☆½	☆☆☆☆	☆☆☆	☆☆☆☆	☆	☆☆☆½	☆☆☆☆	☆☆☆	★★★
Profit Point Accounting 1.01	687	☆☆	☆☆☆½	☆☆½	☆☆☆	☆½	☆☆½	☆☆½	☆☆☆	★★½
QuickBooks 1.0	—	☆☆☆½	☆☆	☆☆½	☆	☆☆	☆☆☆½	☆½	☆☆	★★½
Teknon Accounting 1.30	688	☆☆☆	☆☆☆½	☆☆½	☆☆☆½	☆½	☆☆☆	☆☆☆	☆☆	★★★

Overall value is calculated by multiplying each category rating by the category's weight percentage, summing the results, and rounding to the nearest half number.

Access to Platinum 2.51

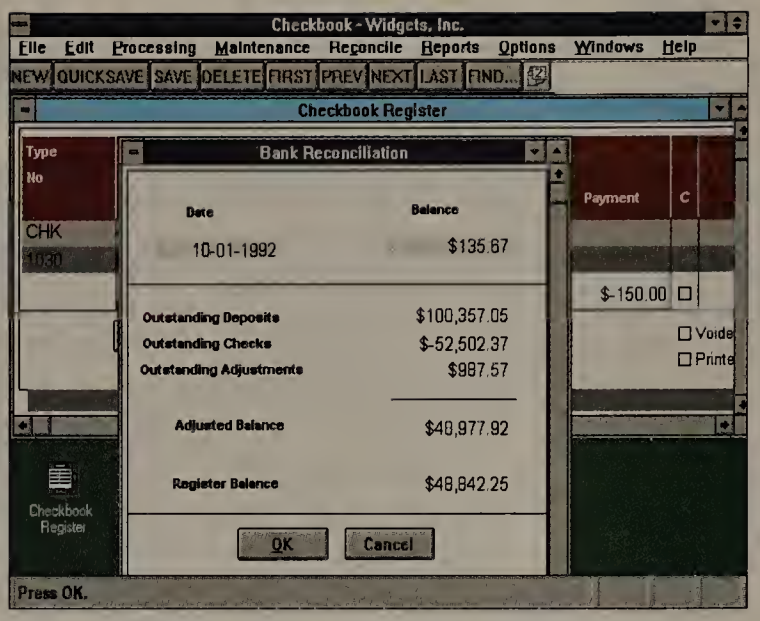
★★ 1/2 **PROS:** Nice implementation of Windows, excellent cash management
CONS: Confusing design

WINDOWS *Access to Platinum* makes good use of the *Windows* interface, but its unstructured approach may be confusing. Its $129 price makes it one of the cheaper *Windows* packages.

In addition to standard drop-down menus, the program has a ten-button ribbon bar for quick access to frequently used functions. Unfortunately, the button descriptions are not always intuitive. To look up an account name from a customer or vendor list, for example, you click on the Z (for "zoom") button—not an intuitive choice.

Access can keep more than one window open at once, letting you see the checkbook and a balance sheet at the same time, for example. While this is good for tracking details, the program's propensity to open windows automatically can leave you wondering where you are.

Besides all the basics, *Access* includes some less common accounting functions, such as time and billing—ideal for professionals who bill by the hour. You also get a few extras that you wouldn't expect, such as a mailing list manager. And you can keep the details of your accounting data for up to 99 years—about ten times longer than anyone should need.



Access to Platinum's checkbook consolidates all your cash entries for up-to-the-minute cash flow information.

Access excels at cash management—a big plus for small businesses, since knowing how much cash you have in the bank is often more important than knowing your year-to-date profit. The checkbook in *Access* consolidates all cash-related entries to give you up-to-the-minute totals.

Access covers the basics well, and consultants and other users will appreciate the extras. However, the sometimes confusing interface indicates that this program needs another revision to fully exploit *Windows'* power.

Accpac Simply Accounting for Windows 1.0L

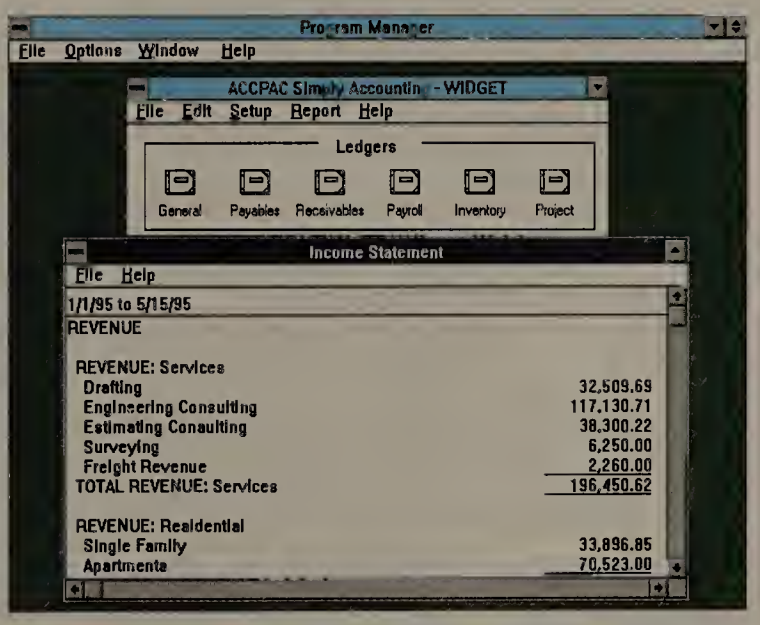
★★ 1/2 **PROS:** Broad array of features, simplified setup **CONS:** Limited depth, invoices and checks not customizable

WINDOWS *Accpac Simply Accounting* is aptly named. At $199, it's an easy-to-use accounting program with a broad array of functions and limited depth. It comes with inventory, job costing, and payroll capabilities, in addition to the tasks reviewed here.

Although *Simply* has a wide range of financial functions, its capabilities are limited in each area. For example, you can't specify payment terms for individual customers or vendors as you can in most other packages reviewed here. Nor can you customize invoices or checks.

Like some other packages, *Simply* lets you jump to functions at will, without forcing you to complete one entry screen before moving to another. That's handy if you're in the middle of processing purchases and get called to check on a customer's credit limit, for instance.

Setting up your books couldn't be easier. You can choose from among six sample charts of accounts; complete information on a sample company is also included. *Simply* even lets you prepare an income statement and balance sheet for every day of the year—we doubt even Ebenezer Scrooge would count his profits that often.



Formatting options are limited when you prepare statements in Accpac Simply Accounting for Windows.

Although it wasn't available in time for this review, version 2.0 of *Simply* is due out shortly and includes several worthwhile improvements. It will permit accounting on a cash basis as well as the usual accrual method, and the screen and menus will make better use of color. The new version will also support Dynamic Data Exchange (DDE) for ledger fields. This will help if you want to link accounting data to another *Windows* program, such as a spreadsheet.

If you have basic accounting requirements, the current version of *Accpac Simply Accounting* could be all you need. It's a little pricey, but it's also one of the easiest packages to use.

M.Y.O.B. 3.0

★★½ **PROS:** Easy-to-follow format, comprehensive features **CONS:** Pricey

WINDOWS *M.Y.O.B.* fits the way the small-business person works, rather than the way an accountant thinks. Its comprehensive features and straightforward approach earn it a Best Buy despite its relatively high $249 price.

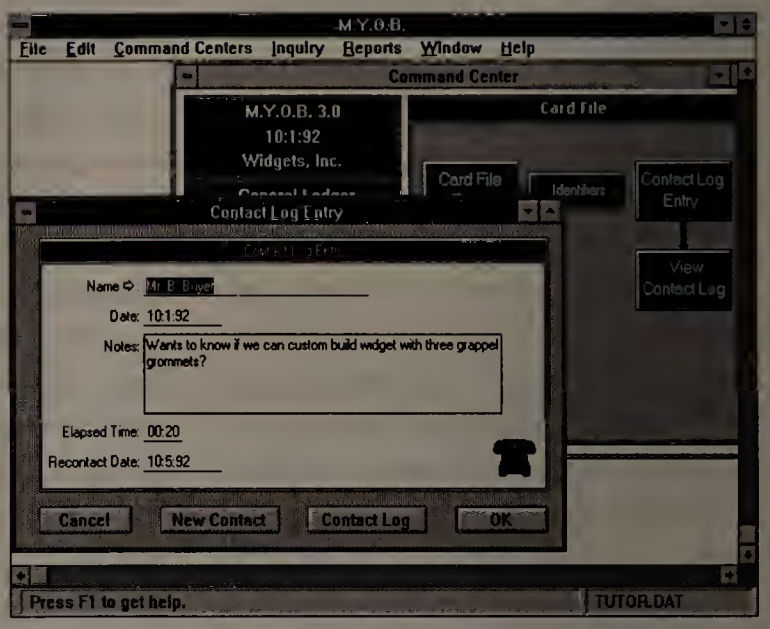
In a break from the traditional design of accounting packages, *M.Y.O.B.* uses flowchart menu screens. Each flowchart is organized around an accounting task, such as tracking a sale. You select accounting functions simply by clicking on the appropriate flowchart box. This unconventional approach takes some of the mystery out of accounting.

When you register *M.Y.O.B.* you also receive a free 48-minute instructional video to help you get up and running.

PC WORLD BEST BUY

M.Y.O.B. is great for adding new customers, vendors, and so forth without climbing back up the menu tree. Other accounting developers should take note of this handy feature.

M.Y.O.B. comes with a contact manager integrated with the accounting functions. You also get a to-do list to make sure you're staying on top of your bills and making optimum use of your cash flow. The program will warn you, for example, when you're about to lose a prompt-payment discount with one of your suppliers.



M.Y.O.B. comes with a contact manager for tracking phone calls and meetings with customers and suppliers.

Accountants like to keep an audit trail by making entries permanent. Users, on the other hand, want to correct mistakes directly, without keeping the original entry. *M.Y.O.B.* lets you have it either way. You can set up your books and password-protect them as either changeable (mistakes are correctable) or unchangeable (the audit trail is preserved). It's the only program here that has this feature.

We like *M.Y.O.B.*'s innovative approach. It's a Best Buy for small businesses with big accounting needs.

One-Write Plus 3.0

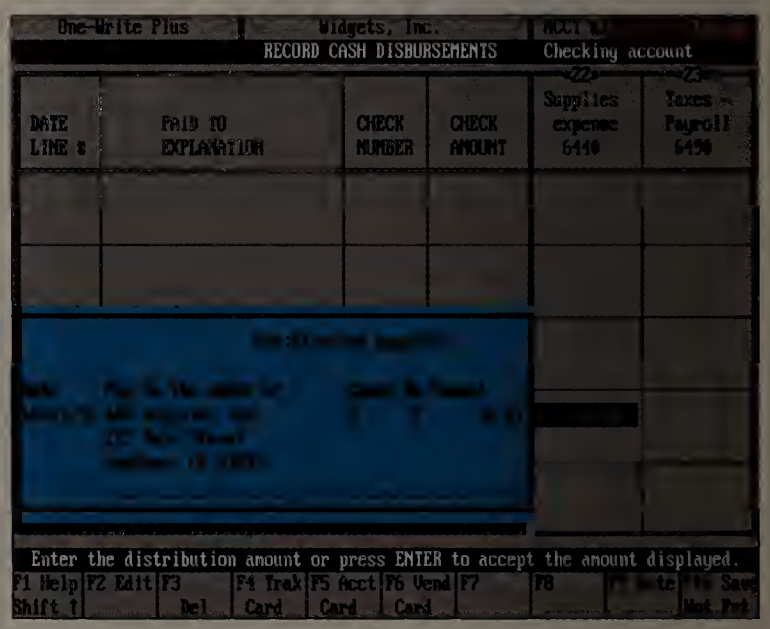
★★½ **PROS:** Appealing interface **CONS:** Limited reporting flexibility, no dedicated inventory module

If you're using a manual one-write bookkeeping system, you'll feel right at home with *One-Write Plus*. It's a computerized adaptation of the one-write pegboard system, where layers of forms and carbons are used to copy entries.

In *One-Write Plus 3.0*, financial recording and reporting options have been improved and the price of the program has been reduced by about 30 percent. You can now add or change ledger accounts on the fly while entering a transaction. Budgets can be entered by period or in account order, whichever is most convenient. A new automatic budget feature gives you a quick start by using actual results for the period you select as the basis for the budget.

Despite its character-based interface, *One-Write* is one of the most visually appealing packages in the roundup. Vertical and horizontal lines simulate a columnar pad of ledger paper. To record a check, you fill out an on-screen form that resembles its paper counterpart. Scroll to the right to allocate the payment to the appropriate account column.

The SuperTrack feature lets you record details for keeping track of the inventory or costs associated with ongoing projects. It's fairly rudimentary, though, and because it isn't fully integrated, it doesn't have the features needed for companies requiring a dedicated inventory module.



In One-Write Plus you fill an on-screen check form and scroll to the expense column to explain the payment.

For an additional $70, you can get *Accounting Works*, which adds payroll, collections assistance, a spreadsheet transfer utility, a backup utility, and a DOS shell to the basic system. Payroll can also be purchased separately.

One-Write Plus is clearly missing some of the reporting controls necessary for larger businesses. Its lack of reporting flexibility also limits the management information you can get from this system. Still, it's a good package for small enterprises that need an easy way to keep the books straight.

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CODE N4710

FEATURES EVALUATION

Accounting Made Easy

M.Y.O.B. combines a rich set of features with ease of use, while QuickBooks wins the prize for sheer simplicity.

● Yes
○ No
◒ Deficient
▲ Unlimited
▼ Limited only by available disk spoce or memory
n/a = nat applicable

	Access to Platinum 2.51	Accpac Simply Accounting for Windows 1.0L	M.Y.O.B. 3.0	One-Write Plus 3.0	Pacioli 2000 2.0	Peachtree Accounting for Windows 5.0	Profit Point Accounting 1.01	QuickBooks 1.0	Teknon Accounting 1.30
Standard features									
List price	$129	$199	$249	$129.95	$49.95	$99	$99.95	$139.95	$139
Local area network support	●[1]	○	●	○[2]	●	●	○	○	○
Setting up books									
Number of start-up charts of accounts	8	7	5	14	1	3	1	21	13
Maximum number of fiscal periods in a year	13	365	13	13	12	13	12	12	13
Optianal cash basis accounting	●[3]	○	●	●[4]	○	●	●	●	○
Tracking revenues									
Maximum number of customers	▼	32,000	32,767	5000	▼	▼	▼	>1000	▼
Custamer-specific payment terms	●	○	●	●	●	●	●	●	●
Customizable invaice/customer statement	◒/○	○/○	●/●	○[5]/○	○/○	●/●	○/○	○[5]/○	●/●
Recurring invoices	●	○	●	●	●	●	●	●	●
Auto-computes finance charges	●	●	●	●	●	●	●	○	○
Overdue aging categaries	4	3	3	3	5	3	4	4	3
Age-dependent dunning natices	○	○	●	○	●	●	●	○	○
Managing expenditures									
Maximum number of vendors	▼	32,000	32,767	5000	▼	▼	▼	>1000	▼
Vendor-specific payment terms	●	○	●	●	●	●	●	○	●
Customizes check, payment advice formats	○	○	●	○	○	●	○	○	●
Recurring payments	●	○	●	○	●	●	●	●	●
Auto-computes prompt-payment discount	●	○	●	●	●	●	●	○	●
Holds payment af disputed amounts	●	○	●	●	○	●	●	○	◒
Cash requirements report	●	●	●	○	●	●	●	●	●
Financial recording									
Maximum number of ledger accaunts	▼	5000	32,767	500	▼	▼	▼	>2000	▼
Maximum number of apen fiscal periods	13	365	26	16	36	26	18	▲	26
Maximum number af departments (digits)	16	0	3	2	6	9	3	0	2
Maintains budget data	●	○	●[6]	●	●	●	●	●	●
Financial reporting[7]									
Statement of changes in financial pasition	○	○	●	○	●	●	●	○	●
Customizes financial statements	●	○	●	○	●	●	○	●	●
Graphical display af financial positian	○	○	●	○	○	○	●	○	○
Check reconciliation with bank account	●	○	●	●	●	●	●	●	○[8]
Exports to spreadsheet	●	●	●	○[9]	●	●	●	●	○[1]
Password pratectian level	module[10]	module	menu	module	menu[11]	module	system	company	menu
Sales analysis by customer/product/territory	●/●/○	●/○/○	●/●/●	●/○/○	●/●/○	●/●/○	●/●/○	●/●/○	●/●/○
Service and support									
Free support/toll-free support line	○/○	◒[12]/○	30 days/●	30 days/○	○/○[1]	◒[13]/●	30 days/○[1]	▲/○	30 days/○[1]
Daily support (hours)	9	10	9	9	12	9	9	12	8
			BEST BUY						

[1] Extra-cast aptian.
[2] May wark an net under same circumstances.
[3] Using Checkbaak.
[4] In Master madule only.
[5] Service, inventary, and prafessianal invaice formats.
[6] Daes nat maintain budget far period 13.
[7] All have balance sheet and incame statement.
[8] In upcaming release.
[9] Included in Accaunting Warks.
[10] Various privileges far madules yau have access ta.
[11] Eoch menu assigned ane af nine unchangeable security levels.
[12] Limited ta twa calls.
[13] Limited ta ane call.

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Pacioli 2000 2.0

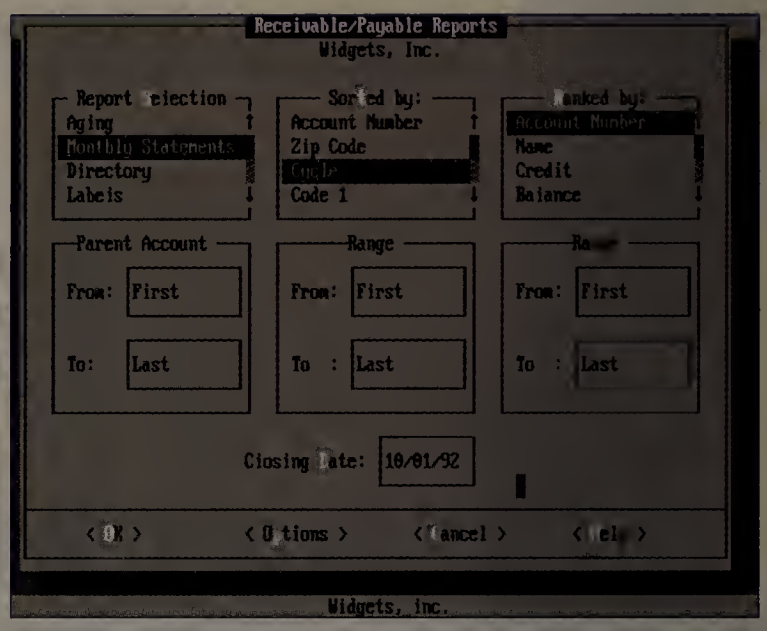
★★★ **PROS:** Cheap, feature-rich
CONS: Difficult to use

Don't be misled by the low $49.95 list price: *Pacioli 2000* is the industrial-strength accounting package in this bunch. It's a fairly easy package to run, but it's also one of the most challenging to learn. Like *Dac Easy Accounting 4.2* (see "DacEasy Instant Accounting 1.0"), *Pacioli* is not a truly graphical package, uses mouse controls, and is unusually rich in features.

When we last reviewed *Pacioli,* it came with a free instructional video and free unlimited technical support. Now you have to pay for both. That's a shame, because if you're going to need help learning any of these programs, it's going to be *Pacioli.*

Version 2.0 adds quite a number of improvements; a few make the program easier to use. The account structure has been modified to separate customer and vendor accounts, making it easier to find the right account when entering an invoice.

Pacioli's revenues module is a standout—better than you'd expect from such an inexpensive program. Features include almost everything you could hope for, including a series of dunning statements, depending upon the date of the past-due customer account balances. You can have up to 36 monthly periods open at once. This means you can post adjustments for up to two years prior to the current fiscal year.



Pacioli 2000 comes with a wealth of expenditure and revenue reports you can sort using different criteria.

Unfortunately, *Pacioli 2000* clings to the old batch system. You can print only a few things, such as invoices, before they are posted.

Pacioli does the best it can with a character-based interface and comes complete with drop-down menus and dialog boxes.

If you demand a lot from an accounting system, *Pacioli 2000* could be the package for you. But better be prepared to spend a fair chunk of time learning how to use it.

Peachtree Accounting for Windows 5.0

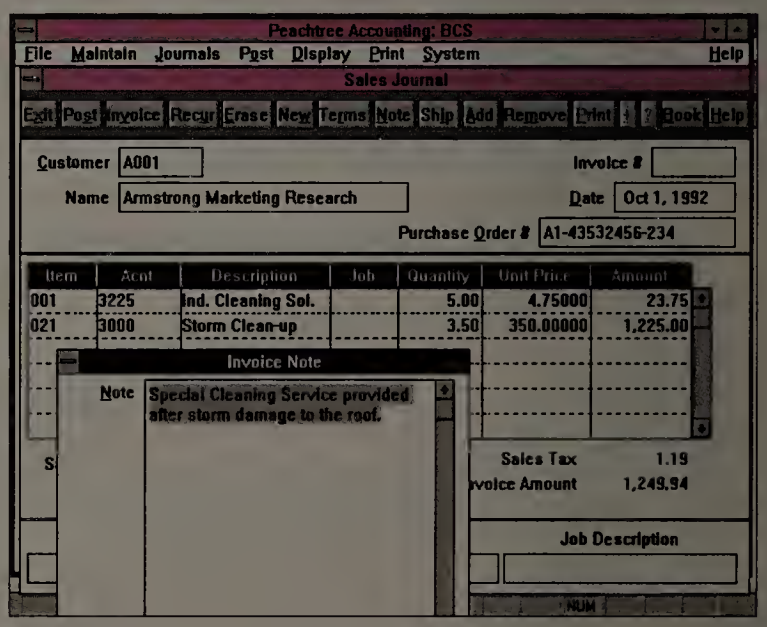
★★★ **PROS:** Competitive pricing, excellent on-line help **CONS:** Minimal support options

WINDOWS *Peachtree Accounting for Windows* offers more for less; the price has been slashed to $99 from $249. The package used to be called *Crystal Accounting,* but more than the name has changed. For one thing, Peachtree has beefed up the on-line help. You now get a hypertext reference manual that answers almost any question about the program or accounting fundamentals.

Reconciling your deposits and checks with your bank statement is much easier in this version. You can see all the transactions affecting your bank account at once, making the process easier.

In previous versions, you had to post your transactions in batches, the old-fashioned way. Now *Peachtree* gives you the option of posting transactions immediately. If you select batch mode and post a batch by mistake, you even have the option of unposting it.

Sales analysis, however, is weak. You can print a sales journal in invoice number order, but you can't analyze sales by territory or product. You can't send out a letter dunning your deadbeat customers for payment, although you can include a short message on customer statements.



Peachtree Accounting for Windows lets you add personal or explanatory notes to customer invoices.

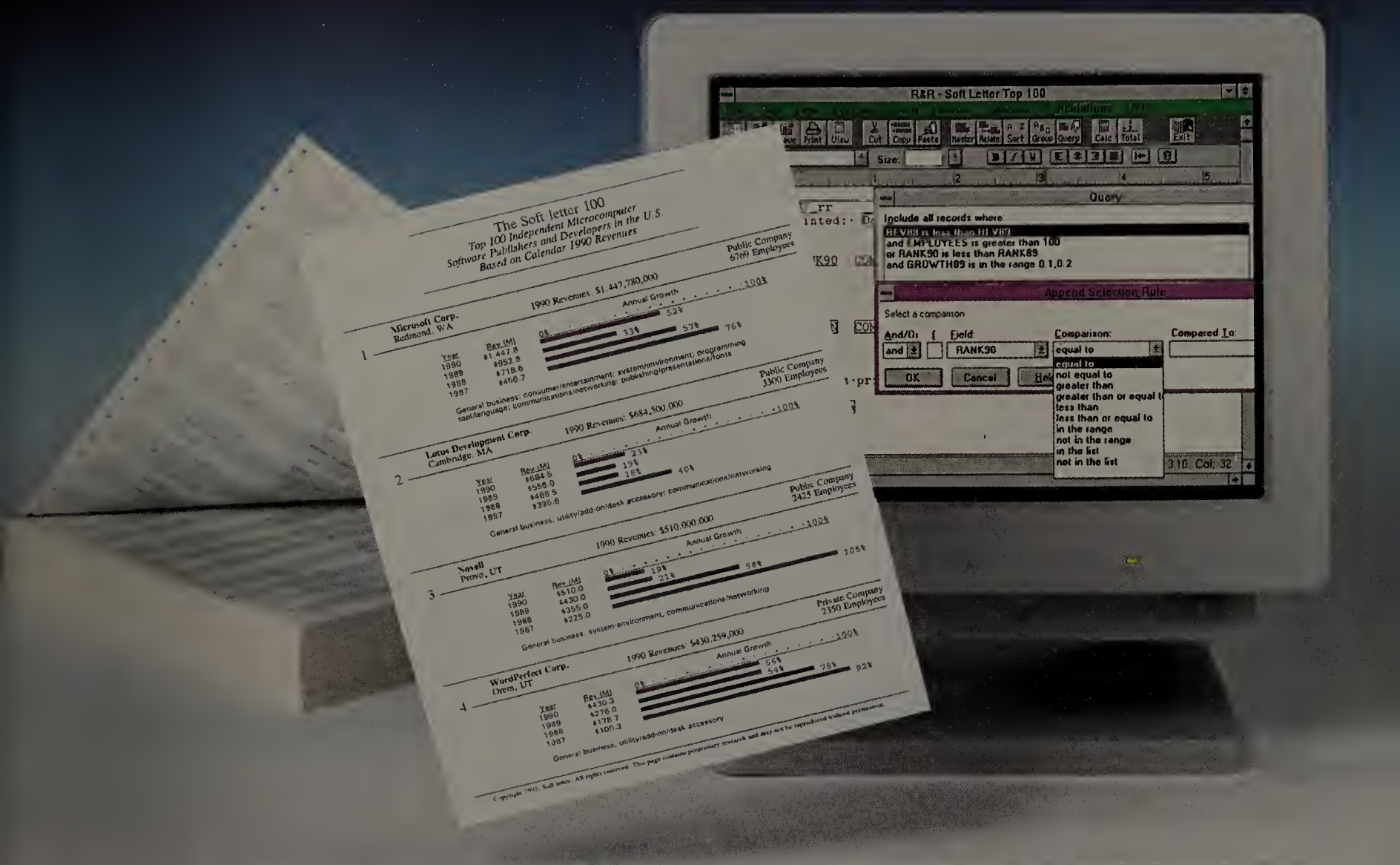
Peachtree has strong support for DDE. It comes with sample files and applications illustrating DDE links with *Excel,* and the user guide discusses these issues extensively.

You can also custom design accounting forms to suit your requirements. Company logos can be imported and placed where you want. *Peachtree* also lets you select from a number of fonts on financial reports.

One-click buttons for commonly used functions are available in a strip above many entry screens.

Peachtree is a comprehensive system with great depth in the accounting functions. It's easy to use but weak on service and support.

A new way to look at your data.



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Circle 181 on reader service card

DacEasy Instant Accounting 1.0

DacEasy makes the popular and successful *DacEasy Accounting* package, now in version 4.2. *DacEasy* has always included one of the most complete sets of features and now offers General Ledger, Purchase Order, Accounts Receivable, Accounts Payable, Inventory, Cash Management, Billing, Graphics, and Report Generator modules, all for $149.95. Just too late for a full review, DacEasy came out with a new, low-end, graphical accounting package—*DacEasy Instant Accounting.* Since we focused this review on graphical accounting packages, it seemed more appropriate to give the new program a quick once-over than to look at the more robust but less graphical *DacEasy Accounting* package. However, users more interested in heavy-duty functions than in ease of use would do well to look at *DacEasy Accounting.*

DacEasy Instant Accounting is an inexpensive program that comes with DOS and *Windows* versions in the same box. The DOS version uses much the same menu and command structure as its *Windows* counterpart, and your data files can be used by either version.

The package handles all the accounting basics: invoicing, paying your bills, reconciling your bank account, and preparing financial statements. It includes a product price list but not a complete inventory function.

Instant also has some potentially useful communications options that you don't generally see in an entry-level accounting package. If you have a Hayes-compatible modem, you can automatically dial your customers or vendors. You can attach a note about your conversation to the account for reference. You can even save invoices or other relevant reports in a file, ready to be sent with a fax-modem. The extra step of allowing you to fax them directly from within the application would have been a useful addition.

Instant holds transactions in a batch, unlike most of the other programs reviewed here. Your books are updated when you decide to post the batch, which isn't as limiting as it might appear. You can print an invoice before posting it—useful for retailers who need sales slips on the spot.

DacEasy Instant Accounting gives you little flexibility in changing invoices, customer statements, or checks to fit different forms.

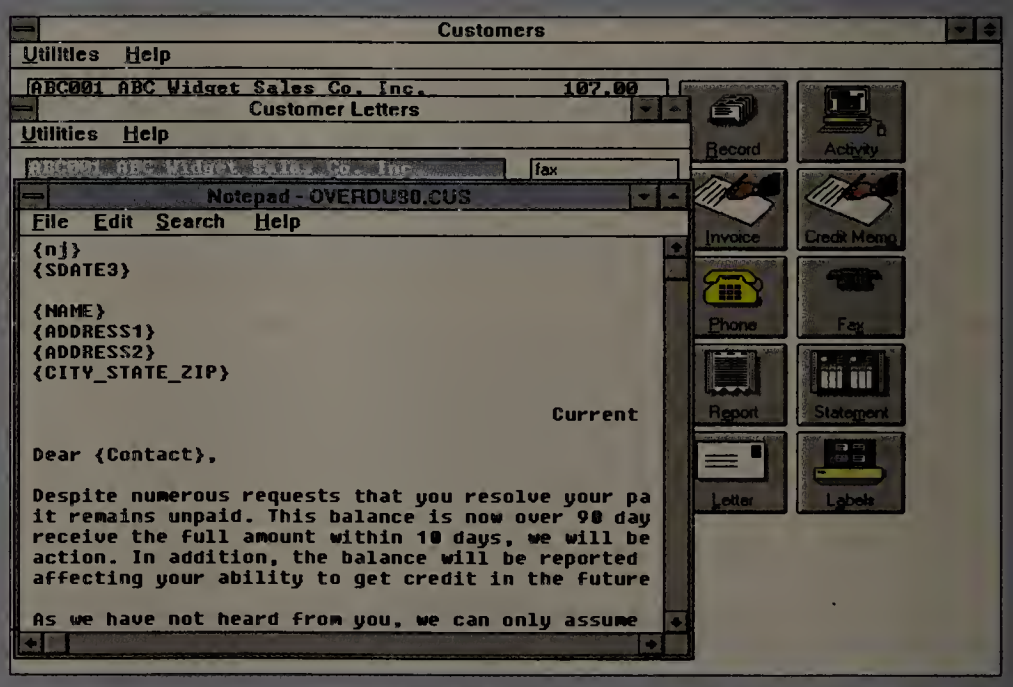
Unfortunately, *Instant* isn't as forgiving as it should be. For instance, if you're entering information in a customer or vendor record and then click on the Done icon, your window closes and you lose any new data you've entered in that record. You must remember to click the Save icon first.

You get 60 days of free support from DacEasy, and on-line support is available via CompuServe and America Online.

DacEasy Instant Accounting is a basic bookkeeping program that's easy to use and sports a price that won't put a strain on your budget. If you're planning to upgrade to *Windows* soon, its dual-system interface is tailor-made for an easy transition.

WHERE TO BUY

DacEasy Instant Accounting 1.0
DacEasy, Inc.
17950 Preston Rd. #800
Dallas, TX 75252
800/322-3279,
214/248-0205
LIST PRICE: $49.95
REQUIREMENTS: IBM PC or compatible, 512K RAM (1MB for Windows), DOS 3.1 or later version, Windows 3.0 or later version (optional), floppy drive, hard drive
Reader service no. 689



DacEasy Instant Accounting features big, easy-to-understand icons. Just click on one of them to activate that function.

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PC MAGAZINE EDITORS' CHOICE
August 1992
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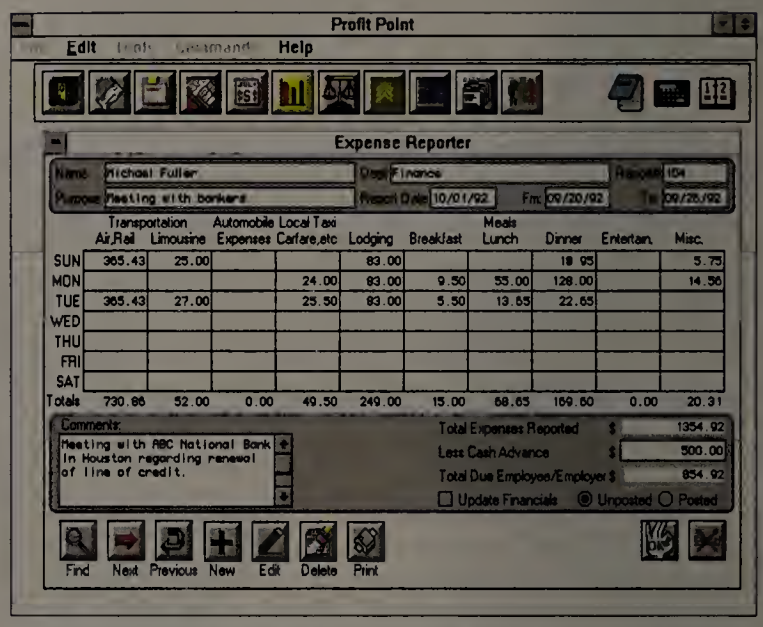
Profit Point Accounting1.01

★★½ **PROS:** Contemporary Windows interface, charting features **CONS:** Difficult to use, limited reporting features

WINDOWS *Profit Point* is a recent entry to *Windows* accounting, and its newcomer status shows. You get an up-to-the-minute *Windows* interface, with one-click buttons and dazzling business charts. But the program has the erratic feel of many first releases.

Profit Point can be a chore to use. It has a number of odd-looking screens, and some drop-down menus pop up elsewhere on your screen. Error messages are unhelpful, and the program's on-line help isn't always available.

These deficiencies are unfortunate because *Profit Point* covers all the accounting basics and adds some potentially useful management analysis capabilities. The Supply Sergeant helps you track orders for the goods you buy for resale. Other tools analyze and graph sales results and determine your break-even point. You can even enter your expense report directly into the program. Report customization options are limited, though. You can't design your own invoices, checks, or financial statements.



Profit Point has some uncommon features, such as this built-in form for expense reporting.

Overall, *Profit Point* feels as though a number of different components were slapped together in a hurry. When you run the break-even analysis, for example, you must remember to activate the Graph-it function to retrieve the data from the Clipboard.

Profit Point uses what it calls a scalable menu system. For example, you can eliminate budgeting from your menus if you have no need for this function.

If you're willing to put up with *Profit Point*'s idiosyncrasies, the special financial analysis features could be rewarding. The $295 price has been cut to $99.95 through January 31, 1993, which makes the package more competitively priced, but waiting for a future version may prove still more profitable.

QuickBooks 1.0

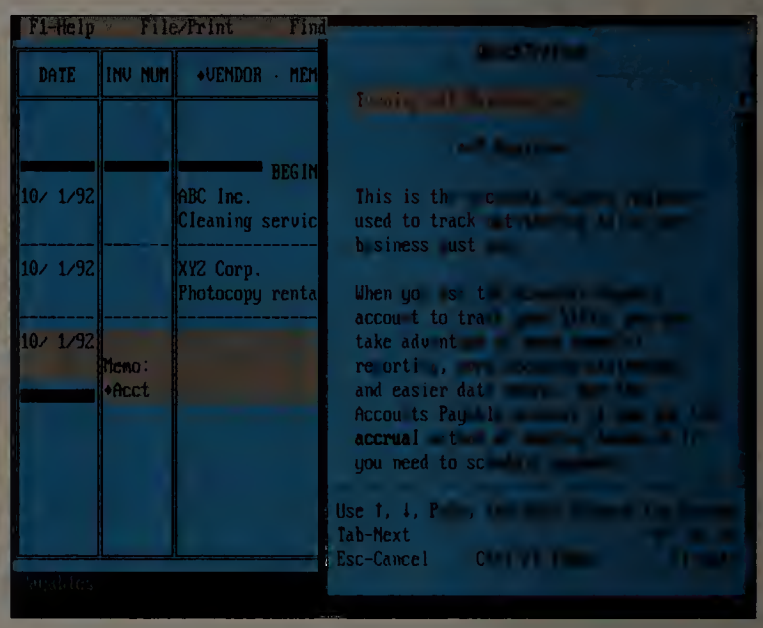
★★½ **PROS:** Excellent help, easy to use **CONS:** Limited depth in several areas

Small-business accounting has never been simpler. If you don't understand the difference between a debit and a credit, *QuickBooks* is the bookkeeping package for you. A low price of $140 also makes it attractive to the first-time buyer.

To create an invoice, simply enter information into an on-screen form that looks much like a paper sales invoice. Add new customers or products on the fly, and enter private notes about each customer—an especially useful feature for following up on overdue accounts. However, *QuickBooks* gets the only one-star rating for managing expenditures due to its lack of features in that area and the low number of vendors' accounts it can handle.

The QuickTrainer facility is inspired. If you hesitate before selecting an option, a QuickTrainer window pops up to give you instructions on your next step. It's as though an accountant were looking over your shoulder and offering you step-by-step advice.

QuickBooks' helpful BizMinder feature is designed to ensure that you don't inadvertently miss a financial deadline. It runs whenever you start up your PC and reminds you if you have checks to print or an invoice to pay.



If you hesitate during a function, QuickBooks' QuickTrainer pops up with handy advice.

In an effort to keep things simple, *QuickBooks* eliminates certain features that larger companies require. For example, the software can't automatically add interest to overdue customer invoices, calculate the commission earned by a sales representative, or keep track of product back orders. It's more suitable to a service-oriented business, rather than one dealing with goods sold. The lack of a true ledger makes it cumbersome to record non-cash entries, such as asset depreciation.

Intuit is the only developer to offer free unlimited technical support. Ironically, *QuickBooks* is so easy to use that you probably won't call upon this facility. It's a great package to help get a one-person business off the ground.

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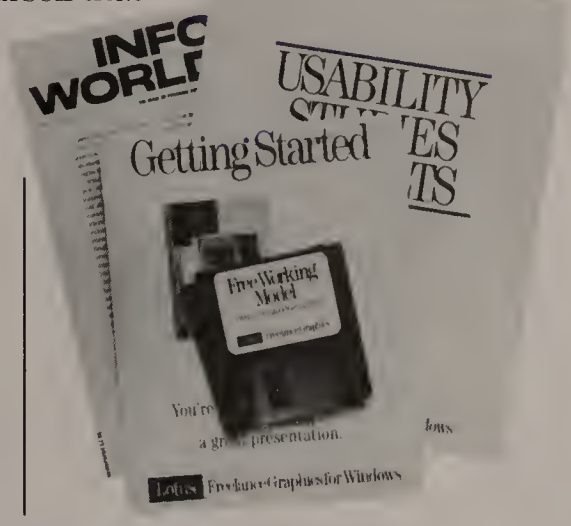

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PEORIA, IL 61612-8823

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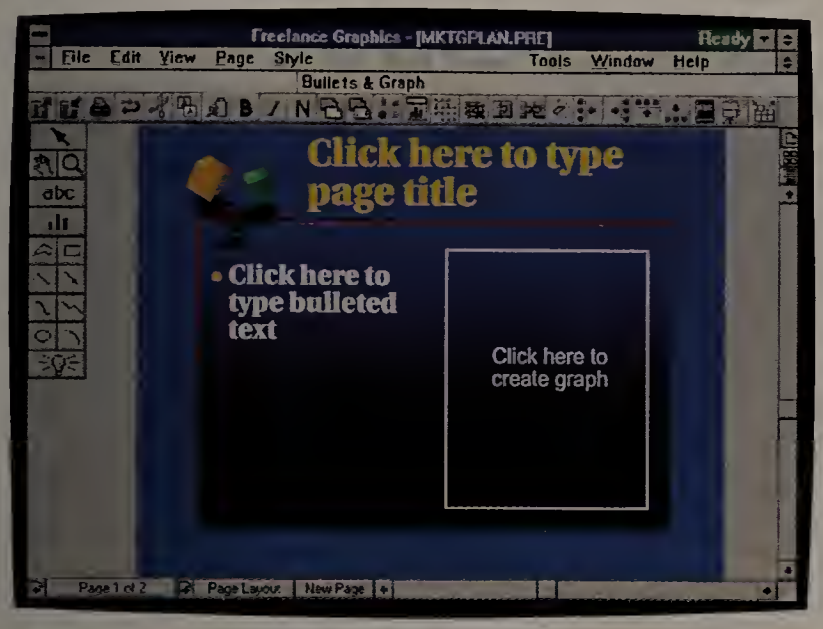

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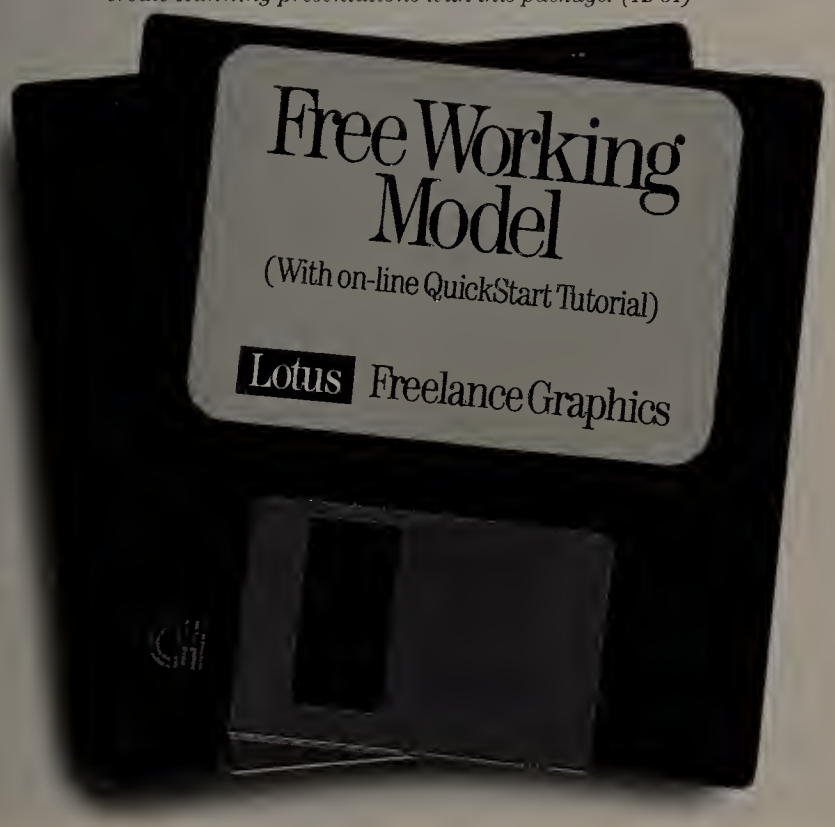

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PC MAGAZINE EDITORS' CHOICE
March 17, 1992
Freelance Graphics for Windows, 1.0

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Lotus Freelance Graphics for Windows

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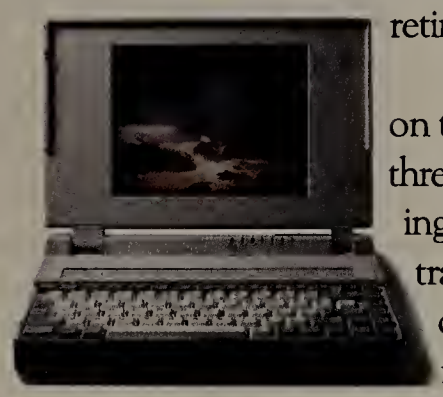

Not to mention that each pixel on the screen is controlled by three individual transistors, ensuring perfect focus and color registration. The result is amazing clarity far superior to desktop monitors and a brighter, faster screen that far exceeds passive matrix LCD color screens.

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Teknon Accounting 1.30

★★★ **PROS:** Easy movement among modules
CONS: No inventory, limited financial reporting

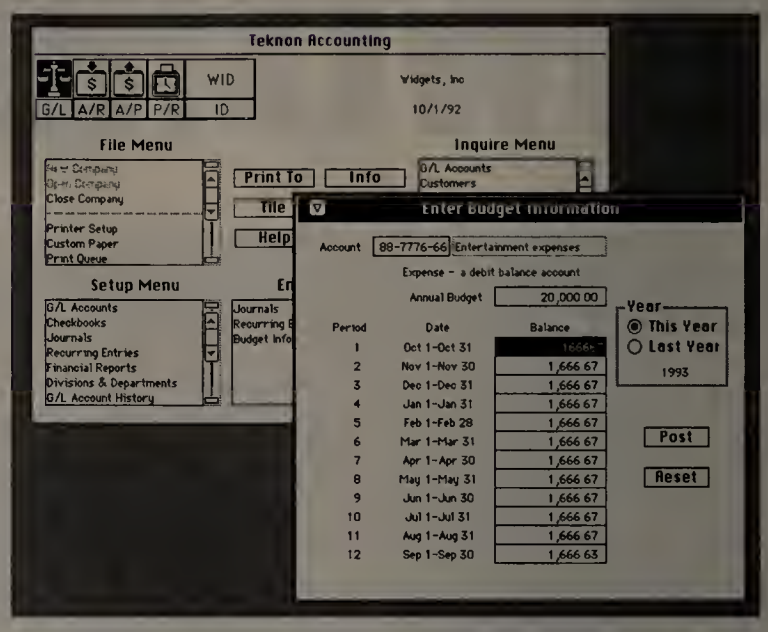
Teknon is a $139 graphical accounting package that runs under plain old DOS. This product and the Mac version offer the same graphical interface.

Teknon's Navigator interface operates like *Windows'*. The right mouse button activates pop-up and drop-down menus. Unlike with *Windows*, however, you can't fine-tune the size of a window by clicking and dragging on one side.

Teknon comes with the three standard accounting functions, plus payroll. First select your function by clicking on an icon in a palette located in the upper left corner of your screen, then select an option from a scrollable menu box. Since you can temporarily leave one area and enter another simply by clicking on the appropriate palette icon, moving around the program is easy.

You can select from 13 predefined charts of accounts for businesses ranging from property management to a florist shop. Because *Teknon* does not track inventory, it's most appropriate for a service organization.

Teknon has some nice touches. For example, you can add a memo to any ledger account. You can also maintain as many as 20 checkbooks. Why so many? In addition to one for regular checks, you might set up another for payroll and another to handle purchases made on a credit card.



In Teknon a $20,000 annual budget is automatically allocated equally to each of the 12 months.

An interesting inquiry option allows you to change certain details of an invoice before it has been paid, such as adjusting the pricing. You can also view any of the details even after the invoice has been printed.

Teknon is a well-thought-out system, with a solid set of accounting features, but its relatively limited reporting features may hinder some users. It's a good choice for many small-business owners who aren't ready to move to *Windows*.

WHERE TO BUY

Access to Platinum 2.51
Platinum Desktop Software
15615 Alton Pkwy. #300
Irvine, CA 92718
800/999-1891, 714/727-3775
LIST PRICE: $129
REQUIREMENTS: 286 or better, 3MB RAM, DOS 3.0 or later version, Windows 3.0 or later version, floppy drive, hard drive
Reader service no. 681

Accpac Simply Accounting for Windows 1.0L
Computer Associates Int'l
1 Computer Associates Plaza
Islandia, NY 11788-7000
800/225-5224, 516/342-5224
LIST PRICE: $199
REQUIREMENTS: 286 or better, 1MB RAM, DOS 3.1 or later version, Windows 3.0 or later version, floppy drive, hard drive, EGA monitor or better
Reader service no. 682

M.Y.O.B. 3.0
Teleware Inc.
300 Roundhill Dr.
Rockaway, NJ 07866
800/322-6962, 201/586-2200
LIST PRICE: $249
REQUIREMENTS: 286 or better, 2MB RAM, DOS 3.1 or later version, Windows 3.0 or later version, mouse, floppy drive, hard drive with 3MB available disk space (5MB on a 386), EGA monitor or better
Reader service no. 683

One-Write Plus 3.0
MECA Software Inc.
55 Walls Dr.
Fairfield, CT 06430
800/388-8000
LIST PRICE: $129.95
REQUIREMENTS: 640K RAM, DOS 3.1 or later version, hard drive
Reader service no. 684

Pacioli 2000 2.0
M-USA Business Systems Inc.
15806 Midway Rd.
Dallas, TX 75244
800/933-6872, 214/386-6100
LIST PRICE: $49.95
REQUIREMENTS: 640K RAM, DOS 2.1 or later version (DOS 3.1 for networks), floppy drive, hard drive
Reader service no. 685

Peachtree Accounting for Windows 5.0
Peachtree Software Inc.
1505-C Pavilion Pl.
Norcross, GA 30093
800/247-3224, 404/564-5800
LIST PRICE: $99
REQUIREMENTS: 286 or better, 1MB RAM, DOS 3.1 or later version, Windows 3.0 or later version (standard or enhanced mode), floppy drive, hard drive, Hercules monitor or better; mouse highly recommended
Reader service no. 686

Profit Point Accounting 1.01
Good Software Corp.
4125 Keller Springs #156
Dallas, TX 75244
800/925-5700, 214/713-6370
LIST PRICE: $99.95
REQUIREMENTS: 286 or better, 4MB RAM, DOS 3.1 or later version, Windows 3.0 or later version, hard drive with 6MB available disk space
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QuickBooks 1.0
Intuit, Inc.
155 Linfield Ave.
P.O. Box 3014
Menlo Park, CA 94026-3014
800/624-8742, 415/322-0573
LIST PRICE: $139.95
REQUIREMENTS: 640K RAM, DOS 2.1 or later version, hard drive with 2MB available disk space

Teknon Accounting 1.30
Teknon Corp.
8603 E. Royal Palm Rd.
Scottsdale, AZ 85258
800/899-8603, 602/596-1500
LIST PRICE: $139
REQUIREMENTS: 286 or better (386 recommended), 640K RAM (2MB recommended), DOS 3.3 or later version, high-density floppy drive, hard drive with 3.5MB available disk space, Microsoft Mouse or compatible, graphics adapter card (VGA recommended)
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TigerSoftware

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VISA, MasterCard, American Express & Discover accepted

THE NEC OPTIMIZED

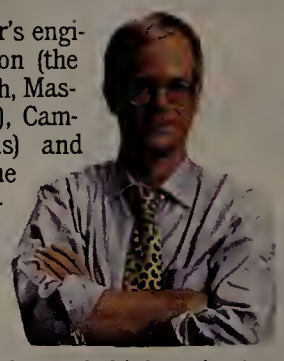
Pre-Loaded With Your Favorite Software, Completely Configured By The Engi

REVIEWER'S NOTEBOOK: *This is an entirely new way to purchase a PC. Tiger engineers have spend almost a year putting these breakthrough PC packages together. I am very proud to present the Tiger/NEC SuperSystems. You CANNOT buy a system in this way from anyone else.*

Why? Because we've taken the industry's fastest, most reliable and best built machines (the NEC 486 PowerMate Image Series) and given them the ultimate in added value. We've loaded the software onto the hard drive for you — but more importantly, we've assembled the engineers and programmers who DESIGNED THE HARDWARE and WROTE THE SOFTWARE to configure and optimize each computer we sell for maximum efficiency and ease-of-use. That means your new system is tweaked and tuned for Windows 3.1 by the insiders who know it best. And make no mistake, Windows can be a strange animal. You could spend weeks setting up your machine — and still not be able to optimize it like we have. Or, you could hire a consultant or VAR (Value Added Reseller) to do it for you — and spend thousands — and you still wouldn't get the same performance. They just don't know what the original software developer knows...

NEC, Lotus, Symantec, Logitech, Microsoft And Tiger Combine To Create The "Perfect Computer."

Your system comes out of the box set up, tested and ready to run, with hundreds of system enhancements. Turn it on and Norton Desktop is at your service. Meetings have been held with Tiger's engineers in Redmond, Washington (the home of Microsoft), Boxborough, Massachusetts (the home of NEC), Cambridge (the home of Lotus) and Cupertino, California (the home of Symantec) for the sole purpose of creating machines with the perfect configuration. They are customized by factory specialists, working from a set of specifications etched in stone by the most advanced thinkers in the industry.



INCLUDES
120MB Hard Drive and 4MB RAM

Why Buy A Machine That's Only Half-Baked?

No one else in the industry has taken the time to put your machine together like this. At best, they simply load the software onto the machine and ship it. And while DELL, Zeos and other computer resellers claim that they sell computers that have "exclusive" compatibility with various software and are guaranteed, only Tiger has individually OPTIMIZED and tested your machine for peak performance. And our guarantee? ONE YEAR, ON-SITE! Beat that. Isn't that what today's competitive world needs?

A More Solid Guarantee Than Anyone Else CAN Offer.

The fact is, when other computer resellers ship your machine without carefully configuring your software, it makes a difference in how your system works, how Windows performs and how much you get done.

486 Horsepower In A Variety Of Flavors.

Why only 486 machines? Our research has found that the 386, although brilliant technology, is already dead. Why settle for a 386 when a lightning fast 486 is just $100 more? With Intel's aggressive pricing, buying a 386 is like buying a four-year-old car for just $100 less than a brand new one. Our competitors can make more money on those 1980s-vintage, 386 machines — but that's not what we do at Tiger. We want our customers to have the best at a reasonable price.

The NEC PowerMate Image Series.

The NEC 486 machines fly — in both Windows and DOS. They come with the legendary performance of a world-class Intel microprocessor, the best in the business. You can choose from 25Mhz, 33Mhz or blast off with the 486/50Mhz monster. The PowerMate Series features NEC's Image Video, which is local bus technology for faster screen displays. Local Bus means that your video bypasses the system's expansion bus (running at only 8Mhz) and goes directly to the processor, running at full system speed. Of all PC components, this video enhancement gives you the greatest boost. Word processing documents, graphics, spreadsheets — everything — explodes onto your screen like never before. This technology increases screen performance by TEN TIMES. NEC was the first, and you won't get this built in advantage with the competitors.

The standard machines ship with 4MB of RAM, and Tiger will expand that for you to either 8 or 12MB. You get a 120MB hard drive and 3.5" disk drive. Check the price box for these system upgrades.

By the way, we customize your system to the memory you choose as well. The 4MB version will be configured for maximum performance, with a different set of specs for the 8MB machine. Dozens of technical enhancements will be made to your system depending on your memory and storage choices. No one else even thinks of doing that.

What Do We Actually Do?

Over 100 individual enhancements are made to your system to improve performance. Among these enhancements is a precise consolidation of the programs we load, for reduced path travel and faster, more efficient computing. We remove all the unnecessary filters and drivers that just sit there and take up space. We streamline the Windows parameter files and locate the SWAPFILES in the optimum place for both DOS and Windows. It took months to achieve this, working with the original developers, engineers and programmers. We also configure the memory to maximize your computer's interleaving routines and install RAMDRIVE on systems with anything over 6MB.

For Windows, we've taken the little mysteries out of the 3.1 environment, so you won't have to spend months trying to track down hang-ups and incompatibilities. With other computers, you're left on your own to read the industry magazines and technical manuals to do it yourself.

We've learned things about Windows 3.1 that only a small handful of industry insiders know about — and build them into your system before we ship.

NEC: Synonymous With Reliability.

These systems will be the state-of-the-art for a long time. NEC computers are designed and built in the USA, in NEC's Boxborough facility. They are exhaustively tested and re-tested to perform as promised. These machines are NOT built in Asia and re-labeled in America. The United States leads the world in computer technology — and that's where these NEC machines come from. Each part is premium quality, because your computer is only as reliable as its smallest part.

UPGRADE YOUR HARD DRIVE FROM 120MB TO 240MB FOR JUST $200 MORE!

UPGRADE YOUR MEMORY FROM 4MB TO 8MB FOR JUST $299 MORE OR TO 12MB FOR JUST $599!

Call Our PC Specialists: **1-800-395-8443** Int'l Orders: 305-443-8212 Fax: 305-529-2990 We Ship Via Federal Express

Circle 214 on reader service card

Call Our PC Specialists: **1-800-395-8443**
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486SX/25i: $2295!

s At NEC, Lotus, Symantec And Microsoft. Optimized For Instant Productivity.

THE PERFECT PC:

The NEC PowerMate 486 *25, 33* **or** *50* **MHz**
Includes 120MB Hard Disk and 4MB RAM.

- Lotus 1-2-3 Windows
- Lotus Ami Pro 3.0
- Lotus Freelance Graphics
- Lotus cc:Mail
- Windows 3.1
- Logitech Mouse
- Norton Desktop
- Norton AntiVirus
- Norton Backup
- Wind-Ease
- DOS 5.0
- Lotus Organizer

AND A ONE YEAR ON-SITE WARRANTY

One Year On-Site Warranty Included.

Monitor not included in Bundle.

THE TIGER/NEC BUSINESS BUNDLE

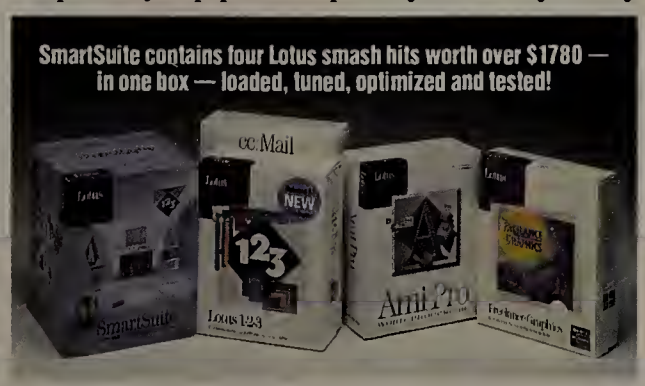
This is where it gets interesting. The Business Bundle includes your choice of the NEC PowerMate 486SX/25i, 486/33i or 486/50i with over $2500 in free, completely optimized software, loaded and ready to run. We start with Windows 3.1, the graphical user interface from Microsoft. We also include DOS 5.0, the ultimate operating system, along with an Logitech mouse and WindEase, a Windows 3.1 tutorial system — learn everything you need to know in less than an hour!

Then there's SmartSuite from Lotus. This is the hottest package in the business — including new Lotus 1-2-3 Release 1.1 for Windows, the incredible Windows spreadsheet that's swept the industry since its introduction; Ami Pro, the visual word processor; Lotus Freelance for Windows, the smart, easy presentation package and now — cc:Mail, the LAN-based electronic mail system.

This package is aimed squarely at savvy business users, bringing cc:Mail to network environments and unlocking new horizons in productivity and convenience. The cc:Mail single-user pack included in SmartSuite is ready to go, for instant communication on any PC or LAN you have.

SmartSuite also features a consistent set of icons, menus, tool — and of course, SmartIcons, so it all works together in a seamless, smooth fashion. Pass information easily between 1-2-3 and Ami Pro, or on to Freelance Graphics.

FREE Adobe Type Manager is included for crisp, clean fonts as well as a complete disk tutorial that gets you going immediately — because, after all, who wants to wait? There's also a 90-minute audio cassette from the Lotus Personal Training System that puts it all in perspective. Just pop in the tape and you'll be on your way to transforming your Windows desktop into an awesome productivity powerhouse.



NEC's IRONCLAD, ON-SITE WARRANTY

The best in the business is backed by a rock-solid guarantee. ONE YEAR, on-site service by fully-trained NEC technologies, Total Service Sites or factory authorized maintenance companies. When you receive your PC, you'll get an 800-number to call if you have the slightest problem.

HERE'S WHAT YOU GET

PowerMate 486SX/25i — includes 120MB Hard Drive and 4MB RAM	$2149.00 value
Windows 3.1	149.95 value
DOS 5.0 with Logitech Mouse	99.95 value
Lotus Smart Suite including	
1-2-3 Windows V1.1	595.00 value
Ami Pro 3.0	495.00 value
Freelance Windows	495.00 value
cc:Mail	295.00 value
Organizer Windows	199.00 value
Norton Desktop For Windows including Norton Desktop, Norton Backup and Norton AntiVirus	149.00 value
Wind•Ease 3.1	29.95 value
TOTAL RETAIL VALUE	**$4656.85**

TIGER SPECIAL — JUST $2295.00

Complete NEC Business Bundles

BC04757 **PowerMate 486SX/25i Bundle** **$2,295.00**
BC04758 **PowerMate 486/33i Bundle** **$2,599.00**
BC04759 **PowerMate 486/50i Bundle** **$2,895.00**

UPGRADES & OPTIONS

BC04779 **Add 4MB RAM** for 8MB total **$299.00**
BC04780 **Add 8MB RAM** for 12MB total **$599.00**
BC04781 **Substitute 240MB Drive** instead of 120MB Drive included in Bundle **$200.00**

Monitor is nat included in Bundle. Please call far available manitars. Lotus Organizer daes not ship till Fall. Yau will receive a free caupon redeemable far the full Organizer package and Installatian/ Optimizatian disk.

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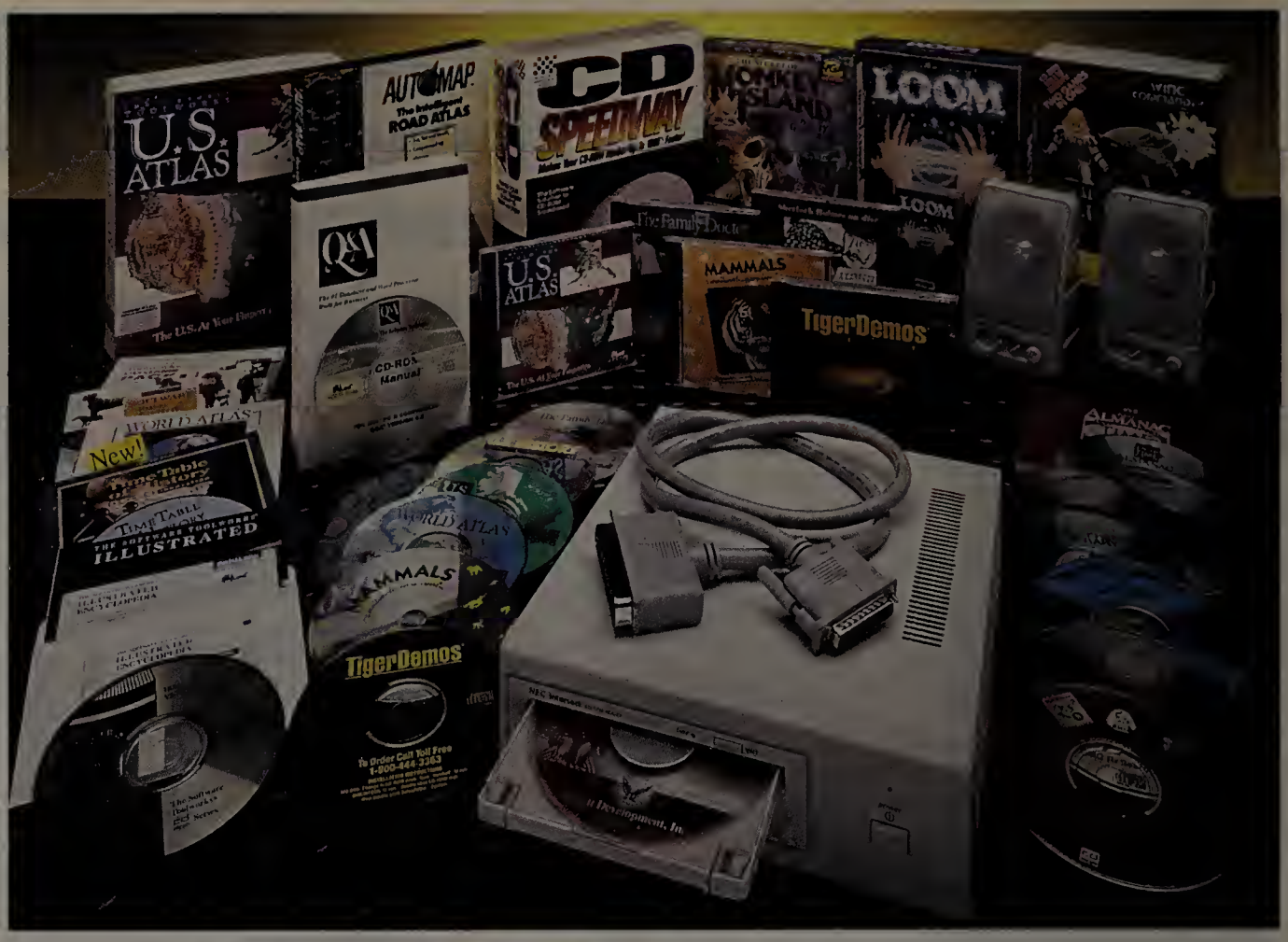
TIGERSOFTWARE

CD-ROM



THE CDR-73 $349

REVIEWER'S NOTEBOOK: *If you're ready to get into CD-ROM, Tiger has a spectacular offer on the fastest reader in the business. The NEC CDR-73, with a remarkable 350 millisecond response time — for just $349!*

The only thing left to buy is the interface kit (deeply discounted to just $159, including cables, earphones and the hot new CD Speedway that accelerates your CD-ROM drive up to 1000%) and you have the hottest drive in the business — ready to rip into megabytes of data.

We've assembled two low-cost bundles of the most popular CD-ROM titles into what we call the Tiger Starter Packs. Starter Pack I includes: World Atlas, U.S. Atlas and Automap, Reference Library, Time Compact Almanac, Toolworks Illustrated Encyclopedia, Guinness Disc of Records, Q&A and our own TigerSoftware Demos. Plus, we'll throw in a pair of Persona Micro Speakers.

Starter Pack II includes: Bible Library, Mammals, The Time Table of History: Science and Innovation, U.S. History, Family Doctor, Sherlock Holmes, Game Pack II, Wing Commander & Ultima VI, Loom and Monkey Island. That's over $1650 worth of current CD-ROM software and accessories for just — are you ready for this? — Just $199!

The Toolworks Illustrated Encyclopedia. Critically acclaimed and widely used, The Toolworks Illustrated Encyclopedia features the entire text of a 21-volume encyclopedia — stored on a single compact disc! The Toolworks Illustrated Encyclopedia allows searches by title, word, or phrase of the latest information on science, contemporary life, law, sports, and much more. Over 30,000 articles enrich this highly regarded reference.

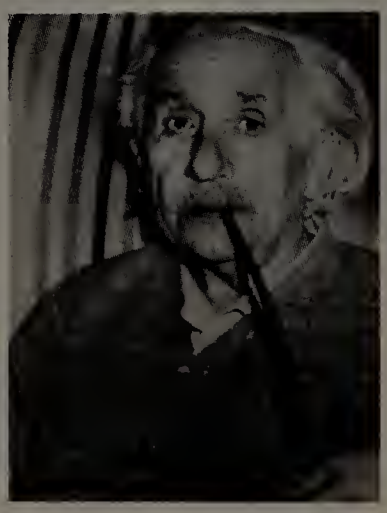
Guinness Disc of Records. Based on the all-time best-selling *Guinness Book of Records*, this CD-ROM makes it easy to locate over 7,000 world records on every topic — from sports to business to natural events (and many unnatural events). Often fascinating and always fun, you can find unique facts about every aspect of the human experience.

U.S. Atlas and Automap. With *U.S. Atlas* simply click on a state or select a city to explore information such as tourism, population and highways — more than 200 topics in 10 categories. With Automap, you get clear, detailed maps that can get you anywhere in the United States that you want to go.

National Geographic Mammals: A Multimedia Encyclopedia. See animated sequences and full-color photos of everything from an aardvark to a zebra. This title brings you closer than you thought possible to a variety of our world's most intriguing animals.

Loom. New — from Lucasfilm Games! In a truly unique fantasy graphic adventure, you play the role of a young Weaver in the Age of the Great Guilds. *Loom* is a tale of magic, music, and dragons that's unlike any other game.

Toolworks Reference Library. A complete home and office reference library on a single compact disc. For the writer, student, business person, educator or trivia buff it's an endless source of information. Reference the most respected and sought-after sources, including: *Webster's New World Dictionary, 3rd College Edition, Webster's New World Thesaurus, The New York Public Library Desk Reference, Dictionary of 20th Century History, J.K. Lasser's Legal and Corporation Forms for the Smaller Business, Webster's New World Guide to Concise Writing* and much more.



Sherlock Holmes. The world's greatest detective, Sherlock Holmes, along with Dr. Watson plunge headlong into their greatest cases. The entire treasury of Sir Arthur Conan Doyle's classic tales on a single CD.

NEC CDR-73

INTERFACE KIT

Interface with cables	$199.00
Earphones	19.95
CD Speedway	99.95
TOTAL RETAIL VALUE	$318.90

TIGER SPECIAL — JUST $159

STARTER PACK I

Persona Micro Speakers	$ 80.00
World Atlas	149.00
U.S. Atlas & Automap	99.95
Reference Library	149.95
Time Compact Almanac	199.95
Toolworks Illustrated Encyclopedia	395.00
Guinness Disc of Records	79.95
Q&A	399.00
TigerSoftware Demos	99.95
TOTAL RETAIL VALUE	$1652.75

TIGER SPECIAL — JUST $199

STARTER PACK II

Bible Library	$595.00
Mammals	149.00
Time Table: Science and Innovation	99.95
U.S. History	395.00
Family Doctor	79.95
Sherlock Holmes	69.95
Game Pack II	79.95
Wing Commander & Ultima VI	99.95
Loom	79.95
Monkey Island	79.95
TOTAL RETAIL VALUE	$1728.65

TIGER SPECIAL — JUST $199

BC04760 **CDR-73 Drive** Interface not included	$349.00
BC04761 **PC Interface Kit** Includes Cables, Earphones & CD Speedway	$159.00
BC04762 **Starter Pack I**	$199.00
BC04763 **Starter Pack II**	$199.00

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THE NEW 16 MILLION COLOR HAND SCANNER

REVIEWER'S NOTEBOOK: *This amazing device makes its world premiere on these pages. TigerSoftware has been granted the first-ever commercial shipment of the new ScanMan Color hand scanners. It's an awesome instrument, loaded with breakthrough technology and sporting a sleek, designer look.*

Logitech ScanMan Color explodes with true 24-bit technology. In fact, it scans and displays all 16.8 million colors that the human eye can see. No dithering, no banding — ScanMan Color captures breathtaking, photographic-quality color down to the tiniest detail. Express your ideas and creativity on an entirely new level...

Two great new color-scanning milestones: first,the Logitech™ AutoStitch feature — it seamlessly merges multiple scans together to create large images. Nothing else can do this, and you can scan photos and illustrations in separate passes and AutoStitch "splices" them together. Perfectly. And the Logitech hand-scanners are the only ones with AutoStitch. The second breakthrough concept is in an advanced new fluorescent light source. It requires no warm-up time, doesn't overheat and produces a more consistent white light.

ScanMan Color scanner includes FotoTouch Color Image Editing software that offers a toolbox-full of enhancement tools and special effects. Manipulate scans to produce incredible images with paint and draw features. FotoTouch also includes AutoStop, a speed warning during the scan, auto-deskewing and monitor/printer calibration. Colors can be precisely matched on-screen to printed samples.

This is an amazing new device.

NEW COLORWORKS!
$495 Value — Free From Tiger

New ColorWorks provides over 450 creative tools at your fingertips. It's a new world of image editing, with dozens of never-seen special effects.

SCANMAN COLOR

BC05288 **ScanMan Color** **$649.90**
Includes Dual Media Diskettes.

LOGITECH MICE

TrackMan. The TrackMan Stationary Mouse gives you the precision of a mouse, but stays still on your desk. Logitech designed TrackMan so your fingers rest comfortably on the buttons and your thumb easily controls the ball. This advanced design features an ergonomic shape which is angled to fit your hand for hours of extra comfort and productivity.

TrackMan Portable. Whether you're on the road or in the office, TrackMan Portable puts Logitech power and convenience in a format that's ideal for portable systems. It attaches to either side of a portable keyboard and is comfortable with either hand.

MouseMan. MouseMan is not just another mouse. Designed with nearly a decade of mouse experience and the feedback of ten million users worldwide, Logitech's MouseMan is the next step in mouse evolution. In right-and left-handed versions, MouseMan provides maximum comfort, reliability and power.

Kidz Mouse. Fun and smart, Kidz Mouse puts children in touch with their computer so they can learn educational programs, do their homework and play games. Kidz Mouse is designed specifically for children.

The Cordless Mouse. The only problem with this new innovation from Logitech is that you'll have to get used to NOT POINTING IT AT YOUR MONITOR! The MouseMan is a cordless, three-button, radio-controlled mouse! No cables, no line-of-sight positioning!

ALSO AVAILABLE
FIRST MOUSE

LOGITECH MICE

BC02588	**TrackMan Combo**	**$89.00**
BC02591	**TrackMan Portable**	**$99.95**
BC02595	**MouseMan (Cordless Mouse)**	**$99.90**
BC02596	**MouseMan for Serial & PS/2**	**$69.00**
BC02589	**Kidz Mouse**	**$49.00**
BC02587	**First Mouse**	**$49.00**

INSTANT DIGITAL SNAPSHOTS!

Introducing The Incredible New Logitech FotoMan...

REVIEWER'S NOTEBOOK: *What is it? In short, it's a portable, digital camera — for your computer. FotoMan takes great pictures with amazing clarity and 256 grayscale richness — then allows you to instantly download them to your PC. It includes a slew of image editing tools that open a world of creative opportunity, and is compatible with virtually all desktop publishing programs. The applications for this new technology are enormous. Insurance and real estate professionals are using it to expedite claims and transmit photographs of neighborhoods and homes. Manufacturers use FotoMan to quickly catalog products and parts, while law enforcement officials are using it to photograph suspects, crime scenes and evidence — without the time and expense of film.*

There are hundreds of practical uses for this new product, but we found FotoMan was also a lot of fun. It comes with an automatic flash, one-button operation and a field of focus from three feet to infinity. FotoTouch provides a sophisticated range of features including 256 grayscale editing. It's one of the hottest new ideas in computing: the digital photograph — taken by a small, portable and easy-to-use camera that allows instant transfer to your computer — without a digitizing board or other hardware.

In the past, getting a photograph into your PC meant using a traditional film method. The film would first be processed into either slides or prints, then scanned or stripped into your document. Now just snap a photo of a new employee, for example, and send it directly to the corporate database. Once the images are downloaded, FotoTouch shows you miniature versions so you can choose the image you want. When you've got your shot on-screen, the FotoTouch software allows you to easily make modifications. Then save your image in either TIFF, CCIT, BMP, PCX or EPS format. There's no film, no developing and no waiting!

LOGITECH FOTOMAN

BC02592 **FotoMan** **$629.00**
Please call for system requirements.

Merges Multiple Scans Together–Seamlessly!

When we first introduced the ScanMan Model 256 Grayscale hand scanner last year, it met with a roar of enthusiasm. We published the results of our testing — unbelievably sharp scans, with crisp, rich detail and 256 levels of gray. Scanning photos, illustrations — and text — was instantly taken to a new level. In head to head testing, we found the Logitech ScanMan Model 256 to be more versatile, faster and capable of producing large crystal-clear images. The 256 levels of gray add more depth and realism to all your scanned images. Logitech had created the ultimate hand scanner, the hottest new product of the year.

But when you work with Logitech, you come to understand that they never sit still. While the ScanMan Model 256 was sweeping the industry (*PC Magazine's* "Editor's Choice," *InfoWorld's* 1991 "Product of the Year," *PC Computing's* "Most Valuable Product of 1991"), they were at work designing an enhancement that would catapult it to another level entirely — a completely new category of scanners. The innovation: Virtual Page Scanning. The Technology: the Logitech Autostitching feature. It automatically "stitches" 2, 3, — even 4 scans together (so it can handle more area than an 8.5 by 11 flatbed scanner!). No other scanner we've ever seen can automatically merge scans into one completely seamless image. The ScanMan Model 256 smooths and de-skews the stitch, while evening the tones across the scans for remarkable images.

Clean OCR Scans...

Here's where the advanced technology of ScanMan 256 shows what else it can do. In our OCR testing, ScanMan 256 produced usable text with fewer errors — scanning faster than any other hand or full-page scanner.

FREE PERCEIVE PERSONAL OCR SOFTWARE
(A $99 Value)

Now Just $349!

LOGITECH SCANMAN

BC02593 **ScanMan Model 256 with Perceive** **$349.00**
Please call for system requirements.

Information & Order Hotline **1-800-888-4437**
M-F 8am-Midnight, Sat. 8:30am-8pm & Sun. 11am-5pm (EST)

TigerSoftware

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VISA, MasterCard, American Express & Discover accepted

The Best Way To Start With Multimedia.

REVIEWER'S NOTEBOOK: ***What is this thing called multimedia? What can it really do? Find out now with this fascinating introduction to Windows 3.1 Multimedia!*** *The world of multimedia is a fascinating mix of sight and sound, combining realistic 3D animation, natural-sounding speech, orchestrated musical fanfares and swirling graphic images. It all comes together simultaneously under Windows 3.1 multimedia. Discover that multimedia is as easy as playing checkers. Simply move the parts along the unique "Timeline" until it's all arranged the way you like. Then sit back as your extravaganza of sight and sound unrolls before your eyes. It's amazing what multimedia can do, and MediaBlitz! is exactly what will introduce you to it!*

You're the director with the latest multimedia breakthrough — *MediaBlitz!* This is an absolute *must have* for every Windows user who wants to find out what multimedia is all about. Produce amazing animated shows, complete with music, animation and sound, that will leave your friends and associates dazed with awe.

With point and click ease, you assemble clips from existing multimedia files — or use the included 10MB of free multimedia files to start your library.

What can you do with your multimedia production? How about embedding it into a word processor or spreadsheet document? Click on the icon in your document and your multimedia extravaganza rolls out in full color, sound and animation! Won't your colleagues be amazed!

See it in full-motion animation! Hear it in life-like digital audio! This is state-of-the-art multimedia — made Easy!

There's no limit to where you can use these great new effects to really get your point across. Create fascinating shows, tutorials, stunning documents and more with this easy-to-use introduction to Windows Multimedia.

The no-charge routine module lets you freely distribute your shows as many times as you like. Next time you want to send a letter, send a powerful multimedia message instead for the ultimate in assertive communication.

Fast & Easy. No Programming!

Graphically create your clips with point-and-click ease using a timeline to create smooth-running, synchronized multimedia shows. In under 5 minutes! Arrange and rearrange until everything is just the way you want it. (After all, you're the director.) And all this without programming! It's unbelievably easy. You simply show where you want animations to be played on the screen and MediaBlitz! plays them!

What kind of files can you use with MediaBlitz? WAVE audio, CD audio, MIDI, bitmap images, animation and more are all easily imported into MediaBlitz! for incredible lifelike realism. Use your own, or start your multimedia library with the free 10 MB of sample files.

Fusing sight, sound and your ideas was never easier. It's the first really fun way to explore the fascinating world of Windows multimedia.

The makers of MediaBlitz! are so sure you'll love it, they're offering a 90-day unconditional money-back guarantee. What are you waiting for?

- Explore full multimedia capabilities of Windows 3.1, and create your own multimedia shows.
- Includes sample shows and more than 10 megabytes of multimedia clip files.

FREE Media Clips–A $59 Value

With The Purchase Of MediaBlitz!

MEDIABLITZ!

BC03420 **MediaBlitz!** Dual Media **$95.00**
Requires 386/20 and above, 4MB RAM, Windows 3.1, VGA.

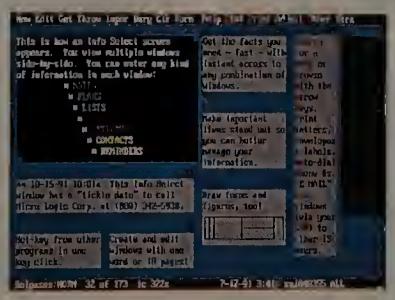
Introducing The "Quick Thinking" Tool.

Info Select: The Next Generation Of Tornado!

REVIEWER'S NOTEBOOK: *Steve Gibson, writing in Info World, called it "...The most useful software program I have ever owned." Formerly Tornado, Info Select will instantly open up new ways to use your PC — improving the way you work, think, find, and manage your daily information.*

No other product we've ever seen has as much potential for personal organization. You'll quickly organize all of the random information in your life: information about projects, notes, ideas, lists, plans — anything. Info Select is packed with new technology — over 200 new features in all! Like advanced Neuron Searching, key highlighting, window sorting and photographic memory.

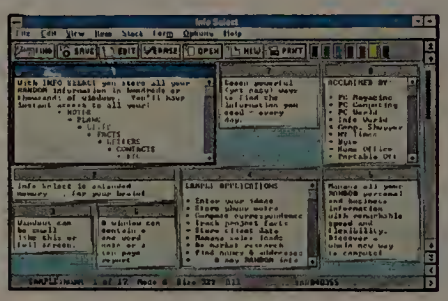
Switch to Info Select when you're on the phone and bring up information instantly on the caller! The innovative "3-D" word processor makes any type of data or information entry fast and simple. Chop larger projects down to size with Info Select's ability to group, scan and cross search through notes with blistering speed. Great information manager and thinking tool.



Graphical organization for DOS users...

Information is a valuable asset. By knowing what's hot, you know what to work on first, who to talk to first and what opportunity to take first...

Information wouldn't be so valuable if it wasn't so hard to gather and manage. You need a powerful, specialized tool to organize random bits of data as they come in — Info Select.



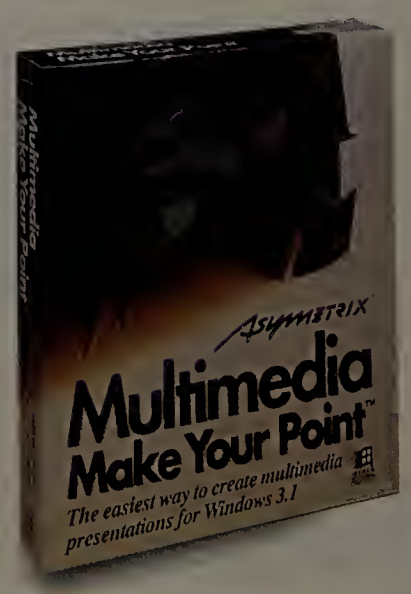
...And powerful tools for Windows!

INFO SELECT

BC03000 **Info Select** **$99.90**
BC03001 **Info Select Windows** . **$99.90**

The 5-Minute Multimedia Presentation!

REVIEWER'S NOTEBOOK: *This new product evolves your current presentations into outbursts of sight and sound, known as multimedia presentations. When I first saw a multimedia presentation, I was stunned. A friendly, natural voice from the computer invited me over. Then the presentation began with an orchestrated fanfare building to a blaring crescendo of horns and strings. The monitor screen exploded in full motion as animated characters provided unceasing action. I was enthralled. For the grand finale, I was presented with push-buttons to select what I wanted to see next. What a presentation! And all this from a 386 PC — which can be created in minutes?*



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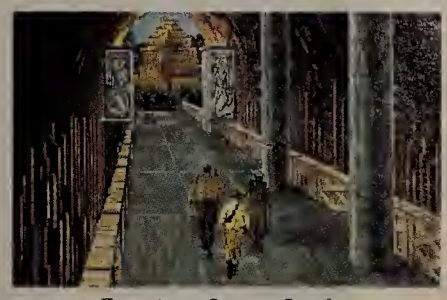

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Windows Alternatives

Is Windows the best place to juggle programs? We compare it with three other DOS-based environments, plus OS/2, to find out what works best.

BY SCOTT SPANBAUER

As readers constantly tell us, *Windows* isn't perfect. Some say it's still too slow even with powerful hardware. Others note that version 3.1 hasn't cured an unfortunate propensity to crash. The most common complaint? The interface is unnecessarily complicated—to the point where some users would rather enter commands at the DOS prompt.

We'd like to remind those who are less than enchanted by *Windows* that reverting to DOS isn't the only option. If you want to run multiple applications, share data between those apps, and manage files smoothly, *Desqview, Desqview/X, GeoWorks Pro,* and OS/2 2.0 may in some cases provide better solutions than *Windows,* especially if you primarily use DOS applications. But if you're mainly interested in finding the

SCOTT BALDWIN

Windows Goes Workstation

The sometimes grudging popularity *Windows* has acquired among PC users is without doubt Microsoft's greatest corporate asset. Buoyed by the success of versions 3.0 and 3.1 over the last two years, Microsoft has big plans for its best-selling environment. Where no single vendor has achieved dominance—the world of high-performance, high-cost engineering workstations—Microsoft hopes to establish *Windows* as the standard. As a result, Microsoft is hoping high-end systems will integrate more easily into networks and run the thousands of existing DOS and *Windows* applications.

An old jazz standard goes, "the difficult I'll do right now; the impossible may take a little while." Microsoft has already accomplished the difficult: making *Windows* run reliably on that hodgepodge of conflicting hardware we call PC compatible. The impossible, extending *Windows* to the demands of workstation applications, all the while maintaining compatibility with DOS versions, may take place later this year or early next year with the introduction of the Windows NT operating system.

Designed to run on 386s and 486s with 8MB of memory, as well as on systems built around MIPS Computer Systems' R3000 and R4000 RISC processors, NT's many-layered architecture will allow other operating systems to run on top of its 32-bit UNIX-like base. NT-based systems will be able to run DOS, *Windows,* OS/2, and recompiled UNIX applications concurrently with Windows NT applications. NT will also take advantage of systems equipped with multiple processors, automatically distributing operating system and application tasks among several CPUs, dramatically improving performance.

And unlike IBM, which has had some difficulty luring developers to write applications for OS/2, Microsoft is guaranteeing that 32-bit programs written for Windows NT will run under a future version of its DOS *Windows* environment. Although existing *Windows* code will need to be rewritten if it's to make full use of the 32-bit application programming interface (API), overhauling applications to work with *Windows'* evolving APIs is nothing new to developers.

Even if IBM does someday produce a stable, "better *Windows* than *Windows*" OS/2, *Windows* and Windows NT may already have managed to get the operating system market sewn up tight.

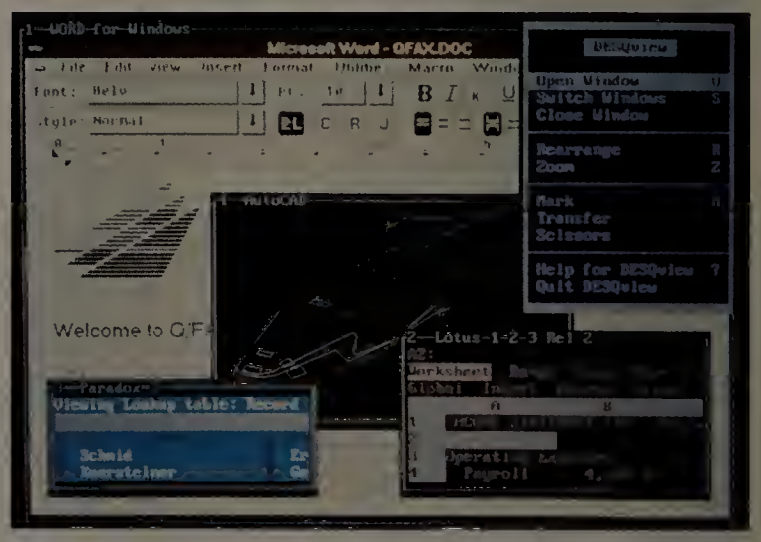
—Scott Spanbauer

best environment to run *Windows* applications, *Windows 3.1* is the way to go.

We tested these four contenders on their capabilities to perform common tasks—file management, task switching, data sharing, multitasking—and then put *Windows 3.1* through the same paces. We wanted to settle a few simple but controversial questions: Which environment best juggled multiple DOS applications or a mix of DOS and *Windows* applications? How did they handle it when all those applications demanded the processor's attention? Which made system-level tasks like copying, renaming, and deleting files easiest? Which was the most stable? And which could run on low-end hardware fast enough to keep you from going crazy?

We performed our informal tests using three different hardware configurations: a 10-MHz 286 system with 2MB of RAM, a 40MB hard disk, and standard VGA; a 33-MHz 386 with 4MB of RAM, a 100MB hard disk, and super VGA; and the latter system with 8MB of RAM. (We didn't put *Desqview/X* and OS/2 through the 286 tests for the simple reason that we were unable to: They require a 386 and 4MB of RAM in order to run.)

With thousands of different hardware configurations and application mixes out there, we could hardly conclude which environment is "best" for everyone. The applications you use determine the environment you need. With this hands-on account, we hope to give you a better idea of your alternatives and perhaps introduce you to a more hospitable operating environment.



Desqview's interface is fast and efficient but makes for impractical windows. The Word for Windows and AutoCAD sessions here can run only when full screen.

Meet the Multitaskers

Desqview-386 delivers more performance with less fuss than any competitor—if you stick with DOS apps. A combination of the *Desqview* multitasker and *QEMM* (Quarterdeck's top-notch expanded memory manager—a *PC World* Best Buy, "Memory Managers," July 1992), *Desqview-386* multitasks more DOS applications faster than *Windows* but fares worse with *Windows* applications and suffers from multitasking and video support limitations with *Windows* applications. Unlike the other environments discussed here, this barebones environment is text-based and comes with few utilities.

Desqview/X, which is a separate product, is actually a memory-hungry superset of *Desqview*. It layers a highly customizable graphical interface, somewhat better *Windows* support, and much-needed utilities over *Desqview*'s underlying multitasking engine. In addition, it incorporates X/Windows, the intermachine communications protocol found on the majority of UNIX workstations. With *DV/X* networked to another X/Window-equipped system, such as a Hewlett-Packard or Sun workstation, users on one machine can run applications on another's system, viewing the output locally. *DV/X* could also extend the usefulness of 286s; an 80286-specific *DV/X* due this summer will similarly allow users of the slower systems to run demanding software on more powerful remote systems.

Desqview users will find the interface familiar, but *DV/X* is not an automatic upgrade. The minimum RAM requirement of 4MB is just that—you may be able to run *DV/X* in 4MB, but you won't be able to do much else. Only on our 8MB system could we open multiple programs and explore the bundled *DV/X* programs, which include a file manager, an application manager that lets you launch programs via icons, an icon editor, blackjack and Tetris games, and a *DV/X*-specific version of *Adobe Type Manager*.

GeoWorks Pro, at first glance, is the frustrated *Windows* user's salvation. It has a snappy graphical interface and comes with a broad selection of useful applications and utilities—including a word processor and a version of Borland's *Quattro Pro SE* spreadsheet. It has its own scalable screen and printer fonts, handles multithreaded applications, and runs on almost any machine. However, *GeoWorks* can't multitask—or for that matter even task-switch—anything except its own bundled applications. And beyond its bundled programs, there are hardly any applications available for it. You can run DOS apps or *Windows* using *GeoWorks* as a DOS shell, but it will cut into your available memory.

GeoWorks Pro, at first glance, is the frustrated Windows user's salvation, coming with a snappy graphical interface and a broad selection of useful programs.

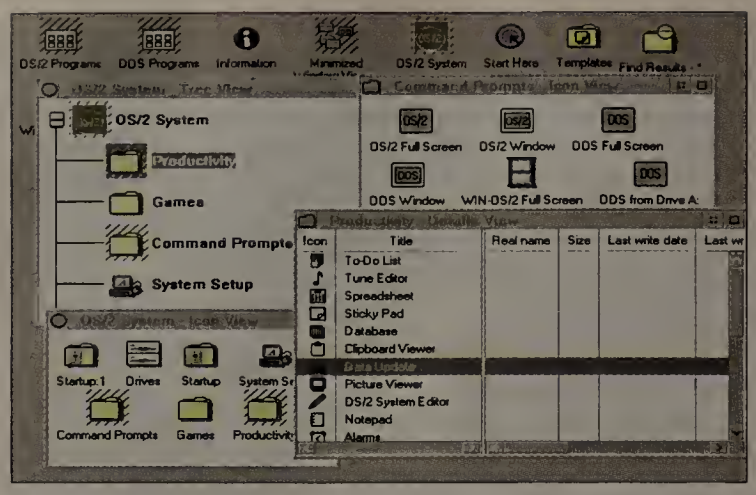
Perhaps *GeoWorks'* best feature is its simplicity; a child could use this environment. Each time you load *GeoWorks*, you choose from among three interfaces—beginner, intermediate, and advanced. The beginner option gives you giant-size icons that run full-screen versions of the basic utilities. Such flexibility makes *GeoWorks* the ideal environment for the family that computes together—at least if members share the same system.

Desqview/X lets you run Windows in a window, sharing the screen with other programs. What price do you pay for this capability? A serious performance hit.

GeoWorks may seem like kid stuff to some, but at least it performs as advertised. Depending on your hardware, and your luck, OS/2 may barely perform at all. We know of cases where people had no trouble installing or running IBM's new operating system, but we know of many other instances where heroic deeds were required to get it running.

Unfortunately, our own experiences fall into the latter category: We spent approximately 9 hours just installing the system. After 4 hours of crunching, the 21-disk installation process went into an endless loop—the default hard disk driver didn't work with our standard, if aging, Western Digital MFM controller. IBM faxed us a convoluted fix that took hours more to complete. Other bugs we encountered remain unsolved, and IBM's apparently swamped support staff took two weeks to respond to some of our calls. When they finally did get back to us, they provided only generic

GeoWorks' opening screen gives you three interface choices tailored to different levels of experience.



OS/2 2.0's Desktop Shell interface is more complex than Windows or DV/X—the deeper you dig, the more configurations, settings, and choices you encounter.

solutions that should have been in the documentation, which—if you want it in book form—costs extra.

OS/2's interface is a cross between *Windows* and the Macintosh, with a touch of Rube Goldberg thrown in. It's clear that intelligent life was involved in its design; the icon-oriented file system reminds you of what *Windows* lacks. Once you get used to the way it works—including using right and left mouse buttons for different tasks—basic navigation is a breeze. Dig deeper, however, and you'll begin to feel like Alice in Wonderland—lost in a maze where every object can be viewed as an icon, a list of object names, or a tree hierarchy.

Basic File Management

All these environments include file managers. Most of them are pretty good, delivering greater ease of use than DOS 5.0's shell. *Desqview*'s file manager is the exception, offering little more than a menu interface to the normal DOS copy, rename, and delete commands.

Desqview/X, on the other hand, adds real file management, displaying two directories side by side and letting you copy and move files or directories from one to the other. You can pop up a directory tree and rename directories and delete them even when they're not empty. You can't, however, format floppies without going to the DOS prompt.

GeoWorks gives you good, standard tools for working with files and directories: You open a couple of directory windows and drag a file or directory icon from one to another. The environment lacks a split-window file management interface; however, you can open up a separate tree view of your disk and from there open another directory.

OS/2's approach to file management is Mac-like: Clicking on a disk icon opens a folder containing file icons. Move, copy, and delete actions are all drag and drop. The latter uses a shredder icon, IBM's analog to the Macintosh trash can. But OS/2's desktop is befuddling in its flexibility. For instance, you can move a file from a window of file icons (which represent physical entities) to another window containing program-launching icons (logical entities). As a result, it's not really clear where the file is—did you physically move it? And if so, where to?

The *Windows 3.1* File Manager has improved enough over the *3.0* version that it's the best of the bunch. It lets you copy, delete, move, and rename files and directories using a split window that displays a tree structure of your disk on the left and a file listing on the right. You can collapse and expand the tree and change the listing by clicking on directories. You can drag and drop files between windows and even load files into their associated applications by double-clicking on them. On the PC, the only way to do better is to buy a third-party replacement for File Manager (see "The Windows Shell Game" in the September issue).

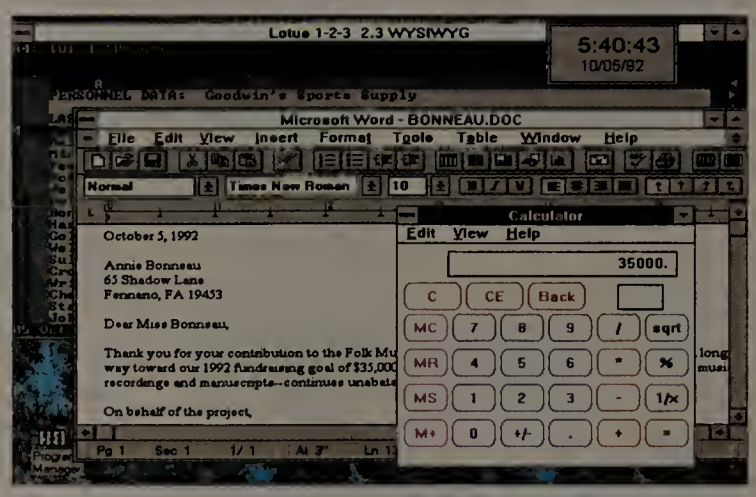
We know of cases where people had no trouble installing or running OS/2, but we know of many others where heroics were required to get it running.

The Great Switcheroo

The capability to keep several applications loaded and switch between them is a service even DOS 5.0 provides. The environments have more overhead than DOS and handle this job with varying levels of efficiency. All but one of the environments add the capability to cut and paste data between applications.

Desqview's panache with DOS applications is due largely to its nongraphical nature—it's a simple yet powerful adjunct to DOS. Like *Windows*, however, it lets you launch programs with a couple of mouse clicks, cut and paste between applications, and write macros to automate command sequences.

On our 4MB 386, we were able to run every major DOS application we had, along with a few utilities. With five DOS programs running, switching was instantaneous. Adding a sixth application initiated virtual memory disk-swapping, which added an 8- to 15-second delay. You can run *Windows* (in the standard 286 mode) under *Desqview* on a 386, and that's how you run *Windows*



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applications. We were able to run the DOS versions of *1-2-3* and *Procomm Plus* in their own sessions and *Excel* and *Word for Windows* in a *Windows* session, without swapping—although this required allocating additional memory to the *Windows* session through a configuration menu. On our 8MB system, we were able to run all our DOS and *Windows* test programs with instantaneous switching.

On a 286, *Desqview* is a good task-switcher; we were able to switch between *WordPerfect* and *1-2-3* without disk-swapping delays. When we added *Windows* and DOS's EDIT to the mix, *Desqview* started swapping.

Task-switching in *Desqview/X* is understandably slower than in *Desqview,* since the interface for each program you run under it must be translated into graphics mode. With two or three DOS programs running, the switching delay was about two seconds. With five programs, it increased to nearly three seconds—noticeable, but hardly frustrating.

GeoWorks task-switches only its own applications. You can run *GeoWorks* as a task itself and task-switch it with other programs under DOS, *Windows,* or OS/2, but *GeoWorks* itself doesn't do the switching. We were not, by the way, able to run *GeoWorks* inside *Desqview* or *DV/X,* although the GeoWorks company told us they know customers who have.

OS/2 loaded on our 4MB system, but getting anything done was nearly impossible—windows, icons, and menus all moved in slow motion as the system's hard disk churned continuously. With 8MB the interface responded quite well, ran four DOS programs without a hitch, and switched between them nearly instantaneously. Adding *Windows* programs, of course, bogged things down. You don't need a separate copy of *Windows* to run *Windows* applications in OS/2 (and, in fact, you couldn't use it if you had it). The operating system runs its own somewhat sluggish, internal, licensed version of *Windows 3.0,* which doesn't include *3.1*'s improvements—OLE, multimedia support, and TrueType, among others.

Task-switching under *Windows* on a 386 is generally quick and painless—until virtual memory kicks in. With three DOS programs running, switching consistently took less than 1 second. Adding a fourth exhausted the memory of the 4MB system. The resultant disk swapping slowed switching to more than 4 seconds. With *1-2-3, Word for Windows, Excel,* and *Procomm Plus* running, switching to one of the *Windows* programs took as long as 9 seconds, and adding *PageMaker* doubled the delay. With a combination of eight DOS and *Windows* programs running, task-switching remained nearly instantaneous on our 8MB machine.

Running *Windows* on our 2MB 286 was certainly doable, if slow. We were able to load a surprising number of applications—*1-2-3, WordPerfect, Word for Windows,* and *Excel*—although *Windows* didn't handle virtual memory as well as it did on a 386. Task-switching

Environmental Overview

Desqview and Desqview-386 2.4

Desqview is unbeaten at task-switching DOS applications and uses less RAM than *Windows.* Quarterdeck's flagship environment is less than able-bodied when it comes to running *Windows* and its applications, however, and includes little software of its own.

Desqview/X 1.02

Built on top of *Desqview, Desqview/X* is an even better task-switcher, it manages *Windows* somewhat more gracefully, and it offers unique intermachine processing. But it's a demanding environment: Effective multitasking, especially of *Windows* programs, requires more than 4MB of RAM and a system faster than our 33-MHz 386.

GeoWorks Pro 1.2

On its own turf—integrated applications—*GeoWorks Pro* is hard to knock, thanks to a scalable interface geared to beginning, intermediate, and advanced users and a fairly complete selection of included applications. But *GeoWorks Pro* doesn't multitask or task-switch DOS or *Windows* applications.

OS/2 2.0

Too much too soon. OS/2 has a lot of promise but doesn't multitask DOS and *Windows* applications reliably. Also, 32-bit OS/2 applications have yet to appear. OS/2 is a little rough around the edges, as well; compatibility with *Windows* and third-party hardware needs perfecting.

Windows 3.1

Although *Desqview* is a bit more economical at multitasking DOS applications, *Windows* is undefeated at juggling DOS and *Windows* programs—and can do it in 4MB or less, although more RAM is helpful. Thanks more to its popularity than any technical qualities, *Windows* also offers the broadest support for high-resolution video.

Unlike the basic Desqview, Desqview/X comes with an assortment of useful tools, all easily accessible through using the icons.

was slow, ranging from 8.5 to 20 seconds. Another problem: On a 286, *Windows* can run DOS applications only full screen, costing you the capability to cut and paste text to and from your DOS programs.

Working Together

More than enabling you to switch among applications, multitasking lets you work on one project while such time-consuming tasks as file downloading, data base indexing, and printing happen in the background. Often, fine-tuning is required to ensure that every application gets its fair share of CPU time.

Preparing to multitask with *Desqview* can be a real chore; programs that should or should not run in the background must be set up carefully. Once prepared, however, DOS programs multitask gracefully. On either 386 configuration, downloading a file in the background had little impact on the responsiveness of other applications.

Windows and its applications, however, slowed down considerably in *Desqview* when DOS programs were working in the background. Even on our 8MB setup, with *1-2-3* and *Excel* running and *Procomm Plus* downloading a file, typing in *Word for Windows* was frustratingly sluggish. Adding more DOS programs to the mix slowed performance further. And you can forget about running *Windows* applications in the background while a DOS program is up front—under *Desqview, Windows* runs only in full-screen mode and halts when it's switched out or run in a window.

In reality, you'll probably run all your programs full screen, since *Desqview*'s windows offer little utility. However, if you've gotten used to the big-screen glories of super VGA, *Desqview* will be a disappointment; the highest resolution supported is 640 by 480 with 16 colors.

Desqview can run applications in the background on a 2MB 286—as long as your expanded memory board conforms to the LIM 4.0 or EEMS standards. But to run normal-size DOS programs in the foreground, you have to disable most of your system's conventional memory and replace it with expanded memory. Without these measures, when we had *Procomm Plus* downloading in the background, the largest program we could load or switch to was 176K, ruling out most commercial apps.

Desqview's panache with DOS applications is due in large part to the nongraphical nature of the interface—it's a simple yet powerful adjunct to DOS.

As with *Desqview,* multitasking DOS applications under *Desqview/X* worked like a charm. Unlike *Desqview,* the super-VGA support lets you see each program's entire display in a window, switch between overlapping windows with a mouse click, and have a visual reminder of what's running.

DV/X converts *Windows'* screen output into X/Windows calls and can run *Windows* in a window or in the background. But this potentially excellent *Windows* support comes with a penalty. *Windows* application performance, even without multitasking, was slow as molasses, and downloading a file in the background brought *Windows* to its knees. Worse, loading *Windows* apps or switching between them often crashed *Windows.* The Quarterdeck tech support staff suggested we run *Windows* in full-screen mode instead (which didn't work either) while they tried to solve the problem.

GeoWorks can't multitask DOS or *Windows* applications, only its own programs. Since there are few of these beyond what comes in the box, the practical uses, at least in an office environment, are extremely limited.

Multitasking DOS applications, *Windows* applications, or a combination of both under OS/2 revealed the same weaknesses found in task-switching: You need more than 4MB of RAM, and the built-in *Windows* environment is decidedly flaky. Even with 8MB, running *1-2-3, WordPerfect,* and *Excel* while downloading a file with OS/2's bundled communications utility (which performed slightly better than *Procomm Plus*), *Excel* was jerky and unresponsive. Setting up a printer turned into an odyssey of redraw errors, with windows that wouldn't go away no matter how many times they were closed.

GeoWorks' interface and included applications and utilities are often snazzier than Windows equivalents.

My Dearest Ellen,

If there is anything better than being loved by you...it is loving you.

And you are so easy to love. You've brought such wonder into my life and have touched my heart with your love.

I just want you to know, my darling, that it feels so good being in love with you and I want to love you for a very long time.

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Yours monogamously,

F1 - Help! F8 - Options

To: Chris Keenan
From: Scott Anderson
Subject: Career-Limiting Remarks
Date: 10/07/91

During a recent dinner at Chairman Binkelheimer's home, you stated that members of the Daughters of the American Revolution are "a bunch of old battle-axes."

Judging from the fact that you made this comment within earshot of the Chairman, you must not be aware that Mrs. B. is a founding member of the local D.A.R. chapter and holds rank of Brigadier General.

Microsoft Word - EVALUATE.DOC

File Edit View Insert Format Utilities Macro Window Help

EMPLOYEE EVALUATION

EMPLOYEE NAME

Anthony Halstein

EVALUATION COVEI

PERFORMANCE OF
Mr. Halstein has distin
pursuer of delinquent
female account holder
observed discussing d
female employees. He

INTRA-OFFICE REL
Miss Catawber, depar
moral turpitude. Miss
for his sensitivity to w

CHARACTER ISSUE
of the quad county are

OTHER COMMENTS: Capt

RECOMMENDATIONS: Term

Pg 1 Sec 1 1/1 At

Microsoft Word - RESUME.DOC

File Edit View Insert Format Utilities Macro Window

RESUME

I got a new job,
LET'S PARTY!

Date: November 3

Time: 8PM

Place: Lyle's Place
123 Unemployment Lane
555-1212

RSVP

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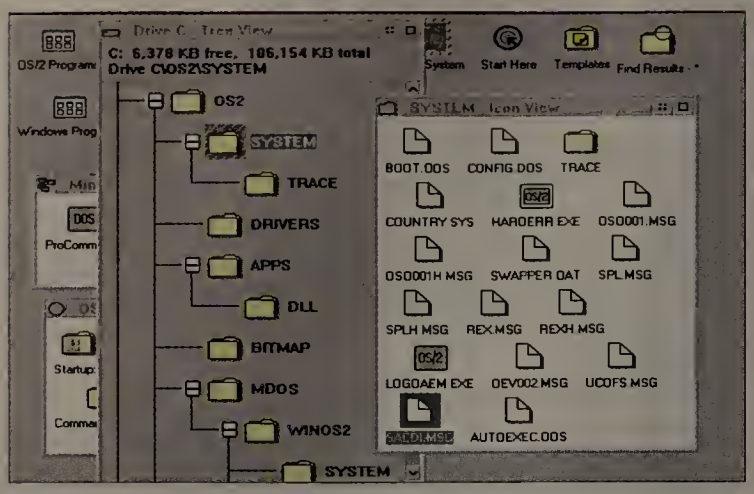


File management is built into OS/2's object-oriented Desktop Shell interface, which lets you work with most objects—whether files or not—in the same ways.

Memory is the key to *Windows* multitasking. Running *Word for Windows* while downloading a file with *Procomm Plus* on our 4MB system, the *Windows* interface remained quick; adding *Excel* slowed things perceptibly—menus no longer dropped down immediately. After loading a few more DOS programs, the interface slowed to the point of being useless. Once again, adding more memory made a big difference. Running the same mix of applications on our 8MB system, the interface responded as quickly as when only a single program was loaded.

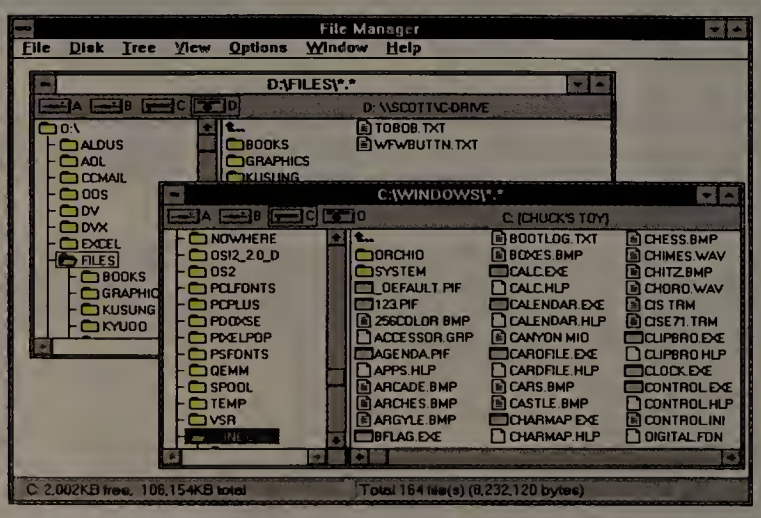
Windows suffers from a major multitasking flaw, however; a single application can't do two things at once. Although you can print in the background from DOS applications, you can't use a *Windows* application while a document is being sent to Print Manager, which for long documents can often last several minutes.

Since *Procomm* Plus can't operate in the background in *Windows* on a 286 system (no DOS program can),we used *Windows* Terminal to test multitasking. Typing in *Word for Windows* was acceptable, but accessing menus and switching windows was slow.

The Best Surroundings

Unless you use a computer only as a family appliance, in which case *GeoWorks Pro* is perfect, you need quick access to responsive DOS and *Windows* applications. OS/2 2.0 and *Desqview/X*, while ambitious, are still too raw to stake your productivity on. *Desqview*, if you stick mostly to DOS programs, is unsurpassed in multitasking performance and simplicity, but puts limits on how you run *Windows* software. Although far from perfect, *Windows* still does the best job running both kinds of programs—for now.

In theory, a multitasking, 32-bit operating system like OS/2 should be faster and more dependable than environments that sit on top of a 16-bit, single-tasking operating system like DOS. And the field of 32-bit OS's is about to get more crowded. NextStep 486, a version of the graphical UNIX environment used on the NeXT computer, should be out by the end of the year. Three other UNIX operating systems that use the industry-standard X/Windows interface—UNIX System Laboratories; UNIX System 5 Release 4.2; Solaris, from Sun Microsystems' SunSoft subsidiary; and the Santa Cruz Operation's Open Desktop 2.0—may be out by the time you read this. All four promise to run DOS and *Windows* applications side by side with 32-bit graphical UNIX applications. (*Windows* support will not be available initially under Open Desktop.) But one nouveau OS looms largest—Windows NT (see *Windows Goes Workstation*). With the promised capability to run DOS, *Windows*, and recompiled UNIX programs, as well as a new breed of 32-bit *Windows* apps, NT may smother its competition's fire. We'll cover these OS's in detail when they become available.



Windows' File Manager doesn't revolutionize how you work with disks and files, but it's good enough to wean you from the DOS prompt.

Scott Spanbauer is a contributing editor for PC World *living in Boulder, Colorado. He can be reached on PC World Online (see page 8 for more information). Charles Lupher contributed research to this article.*

WHERE TO BUY

Desqview-386 2.4, Desqview/X 1.02
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150 Pico Blvd.
Santa Monica, CA 90405
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310/399-3802 (fax)
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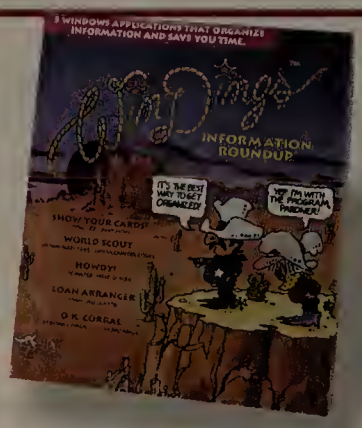

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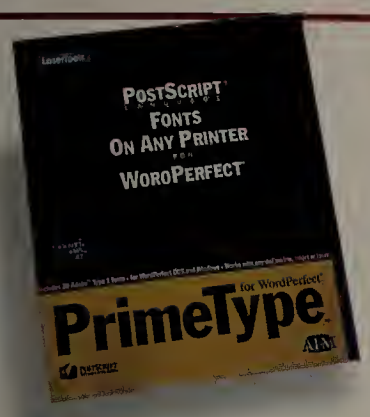

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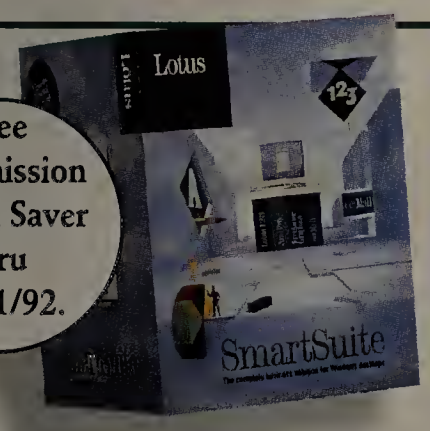

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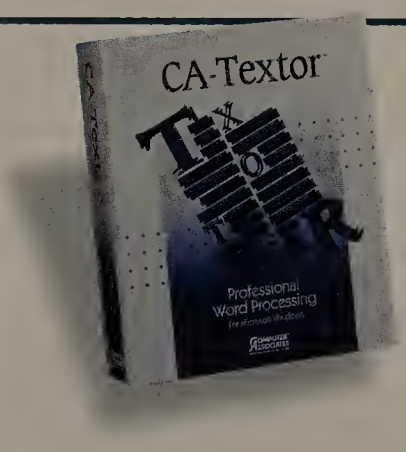

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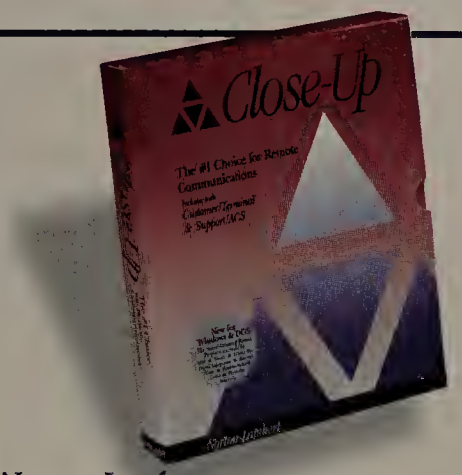

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Broderbund ... CP
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2012 Graphics Ultra with VGA *(with 1 MB)*... 329.
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6999 I/O Board for PS/2 ..... 89.
8380 BasicVGA *(256K, 640 x 480)* ..... 49.
8381 SuperVGA *(1 MB, 1024 x 768)*..... 115.
Bravo Communications ... 2 years
7400 2 Position Laser Compatible Switch Box 109.
7501 CPS1021 *(electronic switch box)*..... 135.
Brown-Wagh ... 1 year
8578 Creative Labs Sound Blaster..... 109.
2336 Creative Labs Sound Blaster Pro ..... 189.
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8158 Typist Plus Graphics ..... 389.
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7894 BJ-10ex Printer *(4.6 lb.)* ..... 329.
8940 BJ-C800 Color BubbleJet Printer ..... 1899.
7897 BubbleJet Ink Cartridge *(BJ-10ex)* ..... 23.
7896 BJ-10ex Sheet Feeder ..... 75.
Cardinal ... 1 year
8689 386SX-33 MHz Motherboard ØK ..... 275.
8690 MVP24I Modem Value Pack ..... 39.
8691 MVPI24IF FaxModem Value Pack ..... 64.
8633 VideoColor 24 VGA7000 ..... 179.
Chips & Technologies ... lifetime
6137 SuperMath 387DX-25..... 81.
6138 387DX-33.... 85. 6126 387SX-25.... 69.
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1947 LabelWriter II ..... 185.
COVOX ... 1 year
5543 Sound Master II ..... 145.
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1708 Ruby-Plus SPF-2+..... 59.
7358 Command Center SPF-4..... 79.
Cyrix Corporation ... 5 years
MATH COPROCESSORS
9875 FasMath 83D87-25..... 89.
9876 FasMath 83D87-33..... 89.
9877 FasMath 83S87-16 *(SX compatible)*..... 69.
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8333 Speedstar 24X..... 179.
6945 Stealth Hi-Color ..... 239.
Epson ... 2 years
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5555 AP-3250 *(80 col., 200 cps, 24 pin)*..... 239.
1906 FX-850 *(80 col., 264 cps, 9 pin)*..... 319.
1904 FX-1050 *(136 col., 264 cps, 9 pin)*..... 449.
2358 LQ-570 *(80 col., 252 cps)*..... 289.
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2357 LQ-1170 *(136 col., 330 cps)*..... 669.
5184 LX-810 *(80 col., 180 cps, 9 pin)* ..... 185.
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1345	OPTIMA 24 Modem	155.
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7395	OPTIMA 144+ FAX 144	479.
9884	Pocket Edition 2400	119.

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3957	LaserJet IIP Plus *(with toner)*	879.
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3295	MouseMan *(combo)* 69. 9766 *(cordless)*	89.

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5638	MultiMedia PC Upgrade Kit 16	969.
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8404	Thunder & Lightning	219.
6497	AudioPort	135.

Megahertz ... 5 years

6576	P296FMV Fax Modem *(9600 baud V.42)*	479.
6574	T396FM Fax Modem *(9600 baud)*	499.

Microsoft ... lifetime

7597	Microsoft Mouse *(bus or serial)*	$85.
2898	Mouse with Windows 3.0 *(bus or serial)*	149.
1896	Ballpoint Mouse *(serial only)*	119.

MicroSpeed ... 1 year

2763	MicroTRAC *(serial & PS/2 interface)*	57.
6007	PC-TRAC Trackball *serial*	75.

Microtek ... 1 year

2736	ScanMaker 600G *(gray-scale scanner)*	759.
2739	ScanMaker 600Z *(color scanner)*	1249.

Mouse Systems ... lifetime

3213	PC Trackball II *(serial)*	55.
7878	PC Mouse III *(serial)*	69.
5979	NewPoint	79.

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4252	MultiSync 3FGX Monitor *(14")*	689.
4249	MultiSync 4FG Monitor *(15")*	799.
3151	MultiSync 5FG Monitor *(17")*	1449.
5377	SilentWriter Model 95 PostScript Laser	1439.

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9590	OL810 Page Printer	1089.
5094	OL830 Page Printer *(8 ppm)*	1299.
3025	Toner Cartridge	25.

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9833	Pacific Page XL *(w/accelerator board)*	699.
5729	ProTracer *(personal CAD printer) (1 yr.)*	1099.

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8993	PM2400 Modem *(internal, V.42bis)*	115.
8994	PM2400 Modem *(external, V.42bis)*	125.
8132	PM2400 Pocket Modem	109.
2266	PM9600 Internal Modem	275.
7934	PM9600SA Modem	289.
2264	PM2400FX96 *(internal modem/fax)*	95.
1344	PM2400FX96SA *(external modem/fax)*	99.
3803	PM14400FX96 *(internal modem/fax)*	359.
2425	PM14400FXSA *(external modem/fax)*	399.

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6444	ProModem Ultima Home Office *(int.)*	389.

PSION ... 1 year

6449	Series 3 Palmtop *(256K)*	379.

Solectek ... 1 year

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6376	Ethercard Plus Elite 16	139.
6372	Ethercard Plus Elite 16 *(6 Pack)*	759.
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9768	VRAM II VGA 1 MB	329.

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1178	Ext. 2400 Baud w/9600 Baud Fax Modem	99.
1181	2400 Baud V.42bis Modem *(2 year)*	115.
3574	Ext. 2400 Baud V.42/9600 Baud Fax	145.
3386	FaxModem AFC *(2400 baud 96S/48R)*	69.
4430	FaxModem AFX *(2400 baud 96S/48R)*	79.
4429	FaxModem V.32bis 9600 baud *(internal)*	259.
4428	FaxModem V.32bis 9600 baud *(external)*	289.
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Conner Peripherals ... 1 year

2339	CP30104H 120 MB IDE HD *(19 ms)*	399.
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6502	Insider 90 PRO 579. 6501 Dual 90 PRO	1479.
6343	PC Powered 90 *(incl. PC2B & cart.)*	499.
6344	PC Powered 90 PRO *(incl. PC2B, cartridge & Central Point Software)*	599.
2500	PC2B-2 Controller	149.
2530	90 MB Cartridge.. 149. 2467 Tripak	439.
8480	Tape250 Insider Tape Backup	239.
8481	Tape250 Inside Half-Height Tape Bckp	259.
8482	Tape250 PC Powered Tape Backup	359.

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1304	1.2 MB External *(for any parallel port)*	239.
2761	1.44EX MB Ext. *(for any parallel port)*	239.

Quantum ... 2 years

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8287	Plus Hardcard II XL 105 MB *(9 ms)*	389.

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6438	SE250 Tape Backup	265.

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6951	1.2 MB Drive for AT	65.
4670	1.44 MB Drive for PC/XT *(3½")*	59.
4326	1.44 MB Drive for AT *(3½", w/Bastech)*	75.
4414	3½ "/5¼ " Dual Floppy Drive	145.

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2497	4 MB x 9 SIMMs *(80 nanosecond)*	139.
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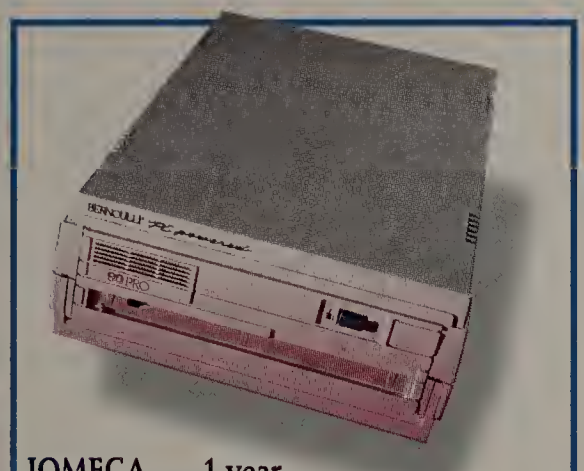

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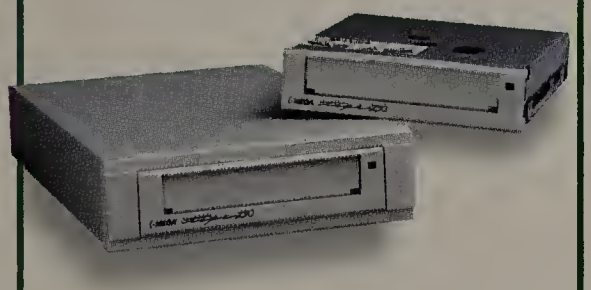

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2239	3½" HD Color Disks *(Qty. 10)*	18.
2243	3½" DS Color Disks *(Qty. 10)*	10.

Sony ... lifetime

3292	5¼" HD Disks *(Qty. 10)*	11.
3297	3½" DS Disks *(10)* 9.	6148 *(30)* 25.
3298	3½" HD Disks *(10)* 15.	6375 *(30)* 42.
8185	QD2040 14.	1895 QD2120 21.

Toshiba ... 2 years

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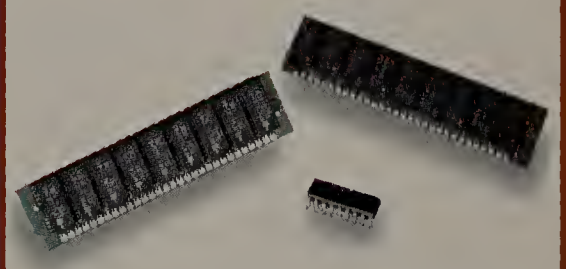

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Depending on paper isn't just ecologically incorrect, it's bad business—so we at *PC World* tried an experiment. Using ourselves as guinea pigs, we set out to find the best way to cut our own paper mountains down to molehills. Our experiences, we figured, would be the basis of this article. We started out with the overly ambitious goal of installing a document management system that would automate the arduous process of storing, retrieving, and routing the hundreds of press releases and other product information we receive every day. It sounded great in theory, but we soon discovered that the price was high, the setup was balky, and the hours of daily maintenance it required didn't justify its hypothetical benefits (see "Searching for Utopia").

Fortunately, our research pointed us toward plenty of less expensive ways to tame the paper monster. Many procedures are so obvious that you're probably already using them. For example, if your office has E-mail, you've discovered how to save time, effort, and sticky notes by sending messages electronically, without resorting to making hard copies for everyone, and storing your messages in electronic folders instead of printing them out.

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Office

The "paperless office" may still be a pipe dream, but a variety of practical products—some of which you may already own—can help you and your office climb out from under.

With E-mail, networks, inexpensive fax-modems, remote communications software, data bases, and scanners, you've got a paper-cutting arsenal at the ready. Half the battle is using common sense to wean yourself from paper dependency (see "Rethinking Paper"); the other is using paper-reducing products. Here's how some readily available tools can help you break the paper chain.

Electronic Forms

Much of the paper you deal with daily probably consists of forms—invoices, purchase orders, expense reports, and so on. They're a hassle to fill out, tough to keep track of, and expensive to store. And losing or destroying them can mean lost time, money, and business.

The intelligent alternative? Electronic form software. Form packages let you design forms or fill out forms on screen and store the information in them in a data manager for later retrieval. If you fill out repetitious information on multiple forms—state, local, and federal income tax, say—you can simply copy information from one form to another.

Form packages range in price from about $150 to $500, depending on their capabilities. Some, like Columbia Software's *FormBase,* Delrina's *PerForm Pro,* JetForm Corporation's *JetForm-Design,* and Power Up Software's *FormWorx for Windows,* are basically data managers that have a form interface. One program, *JetForm for E-Mail,* connects with Lotus's *cc:Mail* so you can route and retrieve completed forms through your E-mail system. Several

BY BRONWYN FRYER

ILLUSTRATIONS BY ANDREA WISNEWSKI

Windows-based relational data base managers, like *Paradox, ObjectVision,* and *Superbase IV,* also come with form modules. (For more information about electronic form packages, see "Perfect Forms With Windows," July 1991.)

Fax-Modems and More

Fax machines produce reams of paper at both the sender's and receiver's offices. A fax-modem is an inexpensive solution to this problem. Fax-modems are handy add-ins that fit into an expansion slot on your PC and deliver better image quality than a fax machine. Because fax-modems let you transmit documents straight from your hard disk, you don't have to print anything or run paper through a fax machine, nor do you risk someone else reading sensitive correspondence. Most fax-modems are easy to use and let you send and receive faxes from within another application.

Fax-modems are also a lot cheaper than fax machines (see our March 1992 buyers' guide). In fact, right now you can buy a 9600-bps fax-modem that comes with DOS and *Windows* software for $99 on the street—and those prices will continue to drop. Most fax-modems come complete with 2400-bps Hayes-compatible data modems too.

If you're on a network, fax gateways—LAN-based software packages—let you and your colleagues share a fax board installed in a file server or a dedicated PC. In addition, many E-mail packages provide gateways to other electronic services such as MCI and CompuServe, where you can send faxes to anyone with a fax machine. If you subscribe to one of these services, you'll be able to receive faxes on line via the service even if you don't have a fax machine or fax board.

While fax-modems make sending and receiving text-only faxes easy, sending faxes that contain images presents challenges. Many fax-modems come with software that converts graphics into PCX or TIFF format; quality, however, can be limited to low-resolution, uneditable bit-mapped documents.

On the receiving end, some fax software programs have optical character recognition (OCR) modules that convert the text—received as a bit-mapped image—into editable text. Don't expect perfection in the conversion, however, since OCR still has a long way to go before it can read documents with 100 percent accuracy. One new package from ZSoft called *UltraFax* lets recipients skip OCR because faxes—images and text—are transmitted in computer-readable binary data format from any fax board.

If you're equipped with a fax board, another product, *Eclipse Fax* from Eclipse Systems, lets you mark up incoming faxes with lines, circles, and arrows, or type. *Norick's Paperless Office* sends, receives, and files faxes while linking to *WordPerfect, 1-2-3,* and other packages; the $495 *PaperLess*

Searching for Utopia

When *PC World* set out to devise a system that would reduce the amount of paper circulating around our offices, we had a dream: Our editors would be able to retrieve scanned-in press releases and other materials as needed from a central storage site, rather than having to hound other editors for needed background materials squirreled away in cubicles.

"The notion of being able to instantly retrieve documents based on keywords, titles, or even text appeals to any journalist who battles piles of press releases and marketing materials," says *PC World* executive editor Russell Glitman.

Among available PC-based document management systems, we chose to look at *Keyfile,* primarily because of its reputation for ease of use. "The *Windows*-based *Keyfile* system promised to provide click-on access to all my files by essentially putting my file cabinet on line," says Glitman.

The goal was to set up a system that would be used primarily by the editors in our news department but that could also be tapped by other editors over our Novell LAN. At any given time, there might be one or two editors retrieving documents, but we wanted all of our 20 San Francisco–based editors to be able to use the system if they needed to find press releases—which comprise a variety of fonts, logos, and sometimes even graphics—or other materials.

In reality, our utopian vision of the less-paper office paled in the face of the effort required to attain it.

Dollar Daze

Our first step was to call Keyfile Corporation to get a shopping list of the hardware and software we'd need to set up a system (see chart to the right).

Since we're a computer magazine, we had the luxury of ordering evaluation copies of these items with the intention of shipping them back to their manufacturers when we were done. Otherwise, purchasing all the hardware and software would have cost us $42,358.

For Experts Only

Keyfile recommends hiring a trained *Keyfile* VAR (value-added reseller) to

Filer 2.2 from PaperLess Corporation lets you automatically scan, compress, and store incoming faxes or retrieve and send out stored documents.

Smart Paper

While fax-modems reduce paper use at the office, new software programs that take advantage of existing fax machines let you store, retrieve, and route documents even when you're on the road.

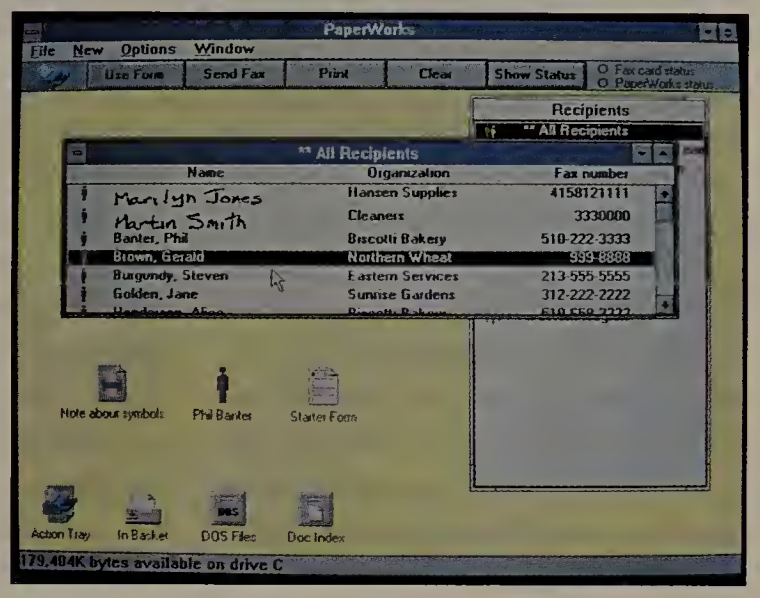
Among the more innovative of these is a $250 product called *PaperWorks* from XSoft. This unique *Windows*-based program lets you use your PC and fax-modem to retrieve, store, and automatically distribute documents when you're away from the office. You simply enter instructions into a paper form and fax it back to your PC, and the program retrieves and sends the designated documents to the people you've listed.

To avoid the hassle of creating, sending, and receiving paper forms and then rekeying the data from them into a data base, you can use *Teleform* from Cardiff Software to turn your fax machine into a data-entry tool. With *Teleform* you create a form and send it to a recipient, who fills it in and sends it back to your PC. *Teleform* grabs the image and does the necessary handwriting and mark recognition to convert the information into one of several data base file formats. (At *PC World* we use *Teleform* to interpret and compile the data our readers fax to us each month in our fax survey.)

Remote Communications Software

How often have you and a distant colleague had to examine and edit the same critical document? Usually, you fax him or her a copy. Then, phone in hand, both of you review it and your coworker marks it up, rekeying corrections later on a PC.

Remote communications software can solve this problem by allowing two distant workers to edit an on-line document at the same time. Instead of laboriously describing what you're doing on a line-by-line basis, you can both see one another's changes and exchange typed



With PaperWorks you can use your PC and fax-modem to retrieve and distribute documents remotely.

The Cost of Document Management

Item	Price
• Two 486-33 PCs (Eltech 330MB hard disk and Arche 120MB or 200MB hard disk)	$6387
• Micro Design Int'l optical jukebox with 6GB of read/writable optical storage for archives	$12,995
• Intel SatisFaxtion Model 200 board plus CAS driver (for faxing)	$499
• Xionics image compression board (interface for scanner and printer)	$4850
• Fujitsu flatbed scanner with sheet feeder	$5650
• HP LaserJet II!	$3175
• Adaptec SCSI host bus adapter (connecting the MDI jukebox to the computer)	$367
• Two Novell NIC 2000 ethernet network interface cards	$470
• Windows 3.0 and 3.1	$300
• Calera WordScan software	$695
• Keyfile (network version) with optical library support (5 users at $995 per user, plus $1995 for the document server)	$6970
• Total	$42,358

install its systems—with good reason, as we discovered. But because we wanted to find out for ourselves what it would take for a technically savvy user to install a document management system, we enlisted the help of an experienced technical consultant and writer, Mark Haas, to set up the system. "This document management system was one of the most complicated systems I ever installed," notes Haas, "because it brings together some of the most complex technologies in microcomputing—LANs, SCSI interfaces, different peripherals, and optical technology."

We started out small, installing the client workstation and a server computer in a cubicle not far from Glitman's office. Haas's biggest problem was trying to get hardware from several different vendors to work together. "It was like trying to conduct a symphony for the first time, with an orchestra of musicians who had never met each other," says Haas. "When I ran into problems, it could easily have become a finger-pointing situation."

Fortunately, Haas received excellent technical support from the people at Keyfile, Eltech, and Arche. *PC World* network administrator Norman Noble also assisted with some network issues. Even so, when Haas began installing boards and wrestling with cables and wires, he found he wasn't prepared for the subtle software incompatibilities between application software, drivers,

➔

comments while working. If your phone line has a voice/data switch, you can even talk to each other over the same phone line. (In our review of remote communications software in February 1992, we favored the $199 *Close-Up Dual Pack 4.0* for its speed, easy interface, reliable error handling, and tools for collaborating with a partner.)

You can also use remote packages to transfer files among users or to dial into a BBS (bulletin board service) or an on-line service. One tip: Place your on-line number on your business card and encourage your contacts to use it.

High-Resolution Displays

Small monitors are a major reason why we cling to the security blanket that paper offers. Chances are you can't see more than half a page at a time, so you print out the entire document to get a sense of its scope.

Fortunately, large-screen monitors, coupled with high-resolution video cards, make it possible to see more of a document at once. With a large monitor, you'll want 800 by 600 or, even better, 1024 by 768 resolution, which will in essence increase your screen display by more than 150 percent over standard VGA. This should greatly reduce the temptation to print an entire document.

As hardware and software drop in price and some of the bugs are worked out of emerging technologies, moving away from paper will become even more practical.

Data Managers

One often-overlooked weapon in the battle for "less paperness" is your office's data base management program. While it's common to keep company information in a centralized data base, a document data base can also serve as a document "pointer." Think about how a "read once" document, such as an article, is used: You make copies of it for all the people who may ever need to read it, and they file it away in a drawer. Nine times out of ten, they won't refer to the article more than once or twice. What's the point in keeping all those paper copies in separate places?

Instead, try making one paper copy of the article and then storing it in a centralized location. You can use the shared data base to store information about the document, perhaps including a brief description and noting its location—like a library's card catalog.

Group Document Editors

Many companies are adopting packages that let whole groups on a LAN work

Searching for Utopia *continued*

and hardware BIOS's and called the vendors to trace them.

To avoid confusion and isolate incompatibilities, Haas worked on getting one component of the system up and running before tackling another. He also kept things straight by keeping careful track of what I/O addresses and interrupts were used by various components. "It's kind of like being the manager of a hotel—you want to know which rooms are occupied so you don't walk in on someone."

Does the Net Work?

Haas also found that the installation documentation from Keyfile was too sparse. "The documentation is definitely not intended for end users," says Haas. When he discovered an error message in sending a file to the print server, "it was a simple matter of specifying a different queue number for the print server. But this wasn't mentioned in the documentation."

Although you don't need to have a network operating system in order to use *Keyfile,* the client and server machines have to communicate at the NETBIOS level. You can set up the *Keyfile* system on its own network, using only the network interface card and connecting cabling, and you can establish a pilot system that can later be plugged into a larger network. But it can be tricky, we discovered, to get the correct version of the NETBIOS to operate with *Keyfile.* And, warns Haas, "you have to be careful to use local bridges to contain the network traffic."

Because document management requires that many processes be running at the same time—the document server, fax board, scanner, OCR server, plus each desktop—performance can be slow. Even with our 486 systems, a Xionics image compression board to accelerate faxing and printing, and an Intel SatisFaxtion board working as a background coprocessor, the equipment was still strained. "No matter how you divide the processes, it's easy to max out the performance of the machine," he notes.

Pretty Interface, Slow Scanning

Once the system was up and running, Glitman and *PC World* librarian Stella Chan took turns at the wheel. Both liked the *Keyfile* interface, which they found friendly and attractive. They found they could keep press releases in electronic folders or mix and match them on the desktop. Alternatively, they could drag a scanned or ASCII document icon from one directory to another or drag it to an out-basket, printer, fax, or job icon. Glitman particularly liked *Keyfile*'s ability to append Post-it–like notes to documents, with messages to himself or his colleagues.

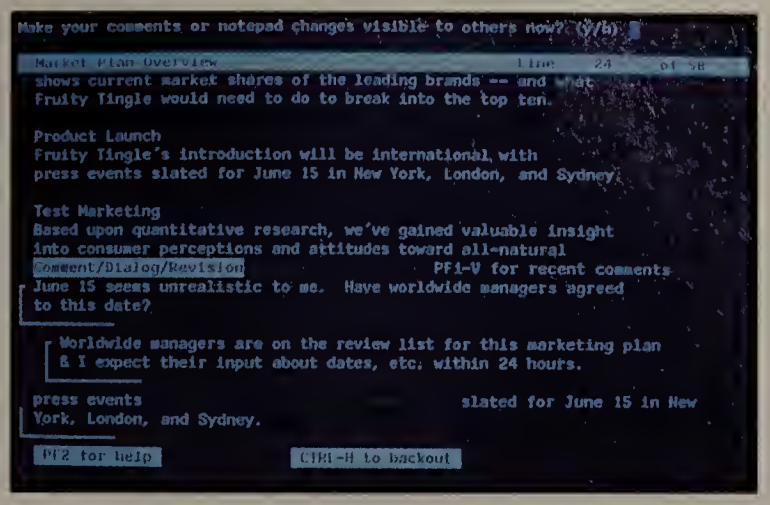
The problem with the system, however, was that although the *Keyfile* software seemed to work well, the technologies it requires created some problems,

together on documents or projects without ever having to touch the Print button. While group editing and work-flow management systems tend to be pricey and usually demand you change your office's work habits, they do spare the copy machine.

Programs like Computer Associates' *CA-ForComment* allow group members to collaborate on documents, simultaneously editing, reviewing, and responding to team members' input, and then track each reviewer's comments and consolidate them into a single annotated copy. Other programs, such as Lotus's *Notes,* let users work on group documents that are stored in data bases on a server and updated at regular intervals (see the groupware buyers' guide in our March 1992 issue).

Image, Document, and Text Management

Image management and document management systems are the newest thing in paper reduction. These systems let you scan paper-bound information into your PC and then store, retrieve, or distribute it to your co-workers. They also let several users access a data base of documents at the same time while keeping the original documents safe from mangling or misplacement. Because files are stored on disk or tape, these systems also reduce the demand for storage space.



CA-ForComment lets team members work on the same document electronically and tracks their comments.

Imaging systems, such as FileNet Corporation's *FileNet,* Plexus Software's *Plexus XDP,* and IBM's *ImagePlus,* are frequently called electronic filing cabinets. Instead of making 30 photocopies for everyone who needs to see a document, you simply use a scanner to turn it into a bit-mapped image. Then you supply keywords and attributes to index the document in a data base, where other people can find it. For storage, you compress the document and place it in a folder. You can keep the folder on a server so that several users can access it at the same time. With the help of the index, it takes only seconds to locate and retrieve information, even if users are in remote offices. Imaging systems come in handy if you have several thousand documents on a variety of subjects, you need someone fairly experienced to make it usable for retrieval." Chan also noted with some annoyance that in order to search by title, she had to type in the full title name, not just a part of it.

Our conclusion? "Unless you have or plan to hire a librarian or administrative assistant to get the paper into *Keyfile* and to maintain an indexing system, a 1920s-style metal file cabinet is still your best bet," says Glitman.

making the entire system impractical to use. The greatest drawback was actually getting the press releases into the system. Says Glitman, "The sheet feeder on the Fujitsu scanner required frequent attention as it periodically attempted to grab two or more pages at once. Unattended scanning was impossible, since the scanner accommodated only a dozen pages at one feeding. Scanning the press releases one at a time was as tedious as photocopying them."

But the biggest disappointment was the quality of the OCR. Dollar symbols and commas were rendered as @, and whole words were missing or garbled. Fortunately, *Keyfile* allows users to catalog documents by keyword as well as by category and type. "This allowed for quick and easy lookup of the bit-mapped versions of the scanned documents, which were perfectly serviceable," Glitman says. "If we had performed OCR, an icon indicated that the document had been rendered in text; clicking on it then provided a split screen with the OCR version highlighted. However, I quickly grew to prefer the bit map. The OCR version was, in essence, worthless."

Searching for documents may have been easy, but setting up any kind of useful indexing system would require the help of our librarian, Stella Chan. "If your indexing is not too complex, then this system is fine," she says. "But if you have to organize a complex group

WHERE TO BUY

Adaptec, Inc.
SCSI host adapter
408/945-8600,
408/262-2533 (fax)

Arche Technologies, Inc.
486-33 PC
800/437-1688,
510/623-8100

Eagle Technology
Novell NIC 2000 ethernet network interface cards
800/733-2453,
408/441-7453

Eltech Research Inc.
486-33 PC
800/358-8330,
510/438-0990

Fujitsu Computer Products of America
Flatbed scanner
800/626-4686,
408/432-6333

Hewlett-Packard Co.
LaserJet III
800/752-0900

Intel Corp.
SatisFaxtion Model 200
800/538-3373,
503/629-7000

Micro Design Int'l
Optical jukebox
800/228-0891,
407/677-8333

Xionics Inc.
Image compression board
508/531-6666,
508/531-6669 (fax)

eral hundred documents you regularly need to view but not edit. Most of today's imaging systems are more affordable than they were a few years ago, but a full rig still costs around $5000.

Document management systems are more complex and expensive, since they perform OCR to convert a bit-mapped image into editable text. Unfortunately, the technology hasn't reached the point where it's practical to scan in hundreds of documents and perform OCR on each one. If you want to use OCR, it makes more sense to route an image and let those who need to edit the document use the OCR software themselves. OCR packages like Caere's *OmniPage Professional* or Calera's *WordScan Plus* will convert scanned documents to editable ASCII text, depending on the quality of the original. Most packages are priced below $1000, and many OCR packages run as low as $295.

Document management systems, such as Westbrook Technologies' *Westbrook Imagic* or Keyfile Corporation's *Keyfile,* usually put documents from diverse sources through a series of processes to convert them into searchable, editable, and easily retrievable documents. If you're in the medical business, for example, and you need to assemble information from doctors, lawyers, insurance companies, and others, you can control the work flow so that documents are automatically routed to the right place. As with imaging systems, this information can be stored on a central file server, where anyone who needs it can find it. Document management systems usually take considerable time and investment to set up (see "Searching for Utopia") but can pay off for the company that's determined to make a go of them.

If most of the documents you use already exist in electronic form, text storage and retrieval software is an inexpensive and practical way to help you locate them. Text retrieval systems process large amounts of data and then let you search for documents by words or phrases. If your text retrieval program

Rethinking Paper

Each year in the United States, the average office worker uses 120 pounds of paper; we spend $6 billion on paper forms alone. Here are some things you can do to shrink your own paper mountains.

1. Think Before You Print

If you're going to use or distribute a document only once, you may not need to print it. And if it's commonly used and often revised—such as a phone list or a status report—you can save time, paper, and energy by storing it on a network server.

2. Part Is Better Than Whole

Some word processors will let you print just a paragraph or two so you don't have to print an entire document. In *Word for Windows,* for example, you highlight a section and choose 'Selection' in the File Print dialog box. If you're in a work group that shares a printer, ask your network administrator to configure the network operating system so that you can eliminate the banner pages, or cover sheets, from print jobs.

3. Double It Up

When a document is a draft, try printing and photocopying on both sides of the paper. (Discoversoft offers a handy tool called *TreeSaver* that you can use to fit up to four pages on a single laser-printed page.) And if you're going to give out handouts from a slide presentation, print your slides four to a page, front and back.

4. Take Advantage of E-Mail

You can use E-mail to do more than simply send and receive messages. Packages such as Lotus's *cc:Mail* let you post messages to bulletin board lists, where everyone in a group can see them. And some packages, like *BeyondMail,* come with "While You Were Out" forms that you can use just like the pink paper ones.

You can also take advantage of E-mail systems and gateways to set up a shared order/inventory system with customers or suppliers.

5. Institute a Paper-Saving Program

While most of us are aware that recycling is important, it often takes a nudge from the boss to break the paper habit. Whether you manage a large company or a small team, you can institute a recycling program—disposing of used office paper in recycling bins and purchasing recycled paper. And you can encourage and reward people who save money by saving paper.

Every little bit of paper saved helps an office run more efficiently. So don't be discouraged if, even after your best efforts, you're still using a lot of the stuff. At this summer's Earth Summit conference in Rio de Janeiro, attendees went through 30 million sheets of paper.

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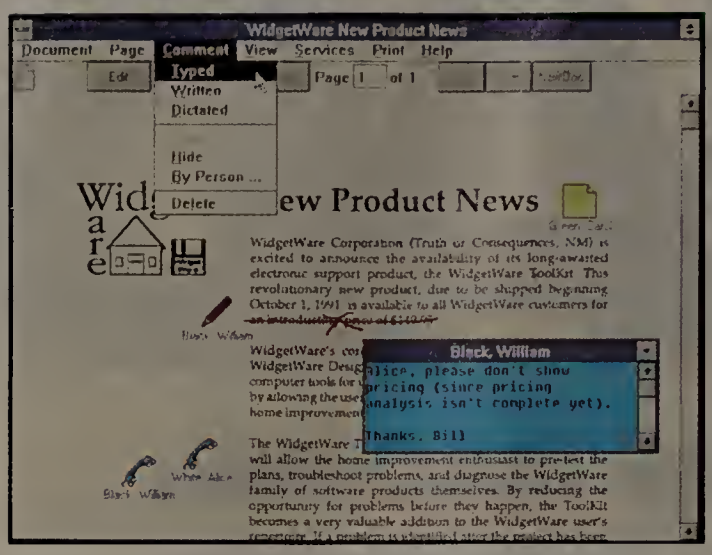
Circle 184 on reader service card



Document management systems like Keyfile convert paper documents and let users include notes.

is *Windows* based, you can cut and paste text directly into other *Windows* applications for editing. One such program, ZyLab's *ZyIndex*, is available for both DOS and *Windows* and is priced at about $395 per user.

On the Horizon

As hardware and software drop in price and some of the bugs are worked out of emerging technologies, moving away from paper will become even more practical. For example, fax-modems will become smaller, and fax-voice boards will let you attach voice "notes" to faxes. Pen-based computers and handwriting recognition technology will become more robust, so instead of printing a document and editing with a pen or pencil, you'll feel comfortable editing your electronic document on screen. As OCR improves, document management systems will improve also, and data base technology will become increasingly adept at handling images. In the meantime, the kinds of products and procedures listed above—as well as thinking twice before hitting the Print button—can go a long way toward eliminating the paper glut.

Bronwyn Fryer is an associate editor for PC World. *She can be reached on PC World Online (see page 8 for more information).*

WHERE TO BUY

BeyondMail for Windows
Beyond, Inc.
800/845-8511,
617/621-0095
LIST PRICE: $995 per server, includes10-user license
Reader service no. 620

CA-ForComment
Computer Assaciates Int'l
617/329-7700
LIST PRICE: $895 per 10 users, $1695 per 20 users
Reader service no. 621

cc:Mail, Notes
Latus Develapment Corp.
800/448-2500,
415/961-8800
LIST PRICE: cc:Mail Windows Platfarm Pack $495, 10-user version $345, 25-user versian $845; Notes single copy $495
Reader service no. 622

Close-Up
Nartan-Lambert Corp.
805/964-6767
LIST PRICE: $795
Reader service no. 623

CompuServe
800/848-8199,
614/457-0802
LIST PRICE: $39.95
Reader service no. 624

Eclipse Fax
Eclipse Systems, Inc.
800/452-0120,
312/541-0260
LIST PRICE: $119
Reader service no. 625

FileNet
FileNet Corp.
714/966-3400
LIST PRICE: base price $100,000
Reader service no. 626

FormBase
Columbia Saftware, Inc.
818/363-2574
LIST PRICE: $495
Reader service no. 627

FormWorx for Windows 2.0
Pawer Up Software Corp.
800/851-2917,
415/345-5900
LIST PRICE: $149.95
Reader service no. 628

ImagePlus
IBM
800/426-2468
LIST PRICE: average price $230,000

JetForm-Design, JetForm for E-Mail
JetForm Carp.
800/267-9976
LIST PRICE: $495; JetFarm for E-Mail $495 for 5 users, $1495 far 20 users
Reader service no. 630

Keyfile
Keyfile Carp.
603/883-3800
LIST PRICE: dacument server $1995, $995 apiece far 5 users
Reader service no. 631

MCI Mail
800/444-6245
LIST PRICE: $35 annual fee plus usage charges
Reader service no. 633

Microsoft Windows 3.1
Microsoft Corp.
800/227-4679
LIST PRICE: $149.95, upgrade from 3.0 $79.95
Reader service no. 632

Norick's Paperless Office
Narick Saftware, Inc.
405/947-7560
LIST PRICE: $495
Reader service no. 634

OmniPage Professional
Caere Corp.
800/535-7226,
408/395-7000
LIST PRICE: $995
Reader service no. 635

PaperLess Filer 2.2
PaperLess Carp.
800/658-6486
LIST PRICE: $495, netwark version $795
Reader service no. 636

PaperWorks
XSoft
Divisian af Xerax Corp.
800/432-9329
LIST PRICE: $249.95
Reader service no. 637

Paradox, ObjectVision
Borland Int'l
800/331-0877,
408/961-9000
LIST PRICE: Paradax $795; ObjectVision $149.95
Reader service no. 638

PerForm Pro
Delrina Technolagy
800/268-6082,
408/363-2345
LIST PRICE: $295
Reader service no. 639

Plexus XDP
Plexus Saftware Inc.
408/743-4300
LIST PRICE: base price $30,000
Reader service no. 640

Superbase IV
Saftware Publishing Corp.
800/237-9391,
608/277-3890
LIST PRICE: $695
Reader service no. 641

Teleform
Cardiff Software Carp.
800/659-8755,
619/259-6430
LIST PRICE: $995
Reader service no. 642

TreeSaver
Discaversoft, Inc.
510/769-2902
LIST PRICE: $89.95
Reader service no. 643

UltraFax
ZSaft Carp.
800/444-4780,
404/428-0008
LIST PRICE: $119
Reader service no. 644

Westbrook Imagic
Westbraok Technolagies
800/949-3453,
203/399-7111
LIST PRICE: $895, LAN versian $1895
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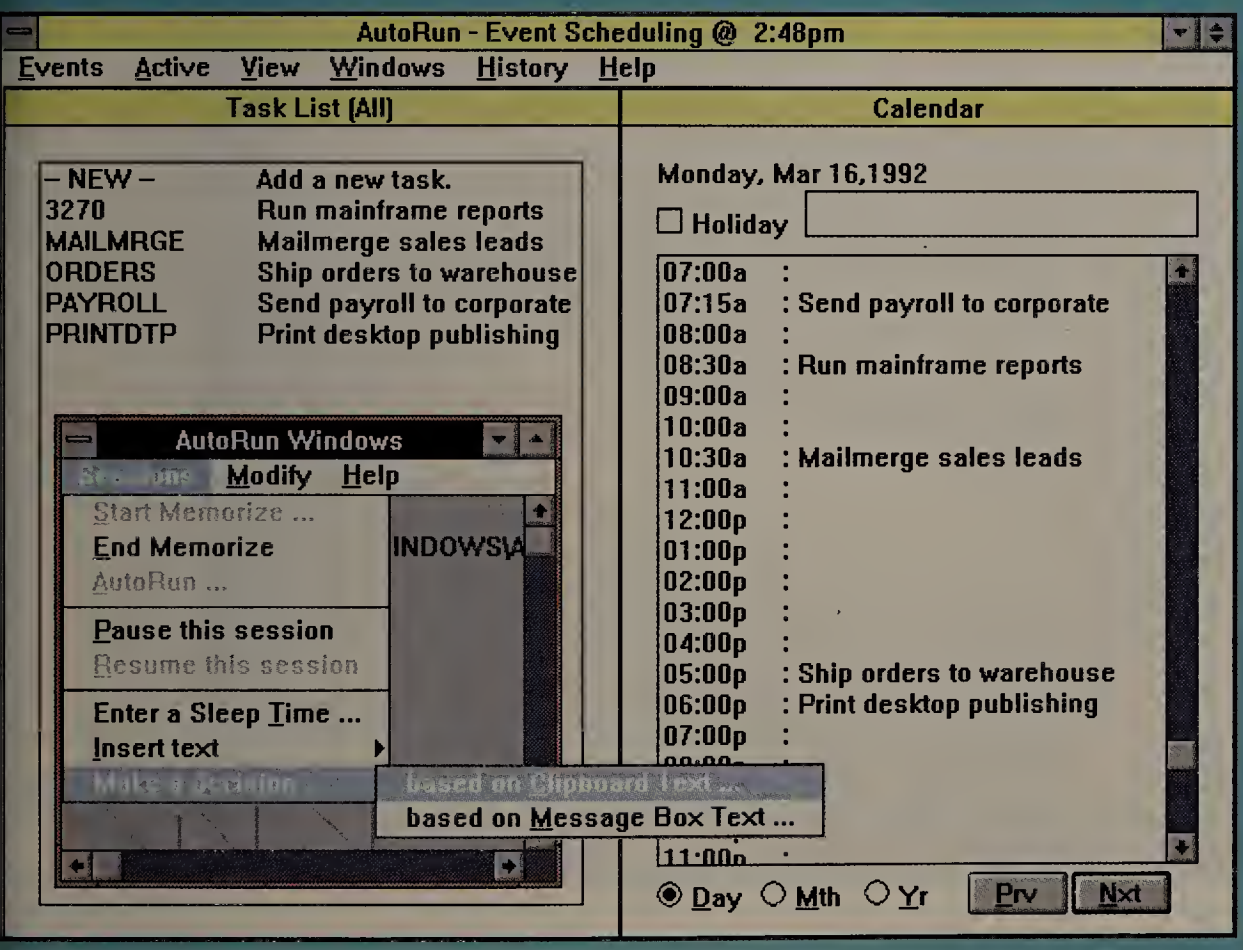

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who can't make decisions.

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Circle 249 on reader service card

Work-Group Printers

As LANs get busier, printers must keep up. A new generation of work-group printers, sporting fast engines, is making network news.

Slow laser printers are bogging down busy office LANs. Until recently an 8-page-per-minute (ppm) Hewlett-Packard LaserJet Series II connected to a dedicated Novell print server was fine for the average network. However, complex print jobs streaming from *Windows*, OS/2, and even Macintosh and UNIX applications are leaving these printers increasingly underpowered and overworked. Fortunately, a new class of fast, economical work-group printers enables you to maintain productivity even on the busiest network.

The HP LaserJet IIISi typifies the work-group laser printer (indeed, it created the category). It comes with a 17-ppm Canon engine; an AMD 29000 processor; optional interfaces to ethernet, token ring, and Apple LocalTalk networks; and a 50,000-page-per-month duty cycle. A $5495 price tag puts it at the top of the work-group printer midrange. Use the popular HP LaserJet IIISi as a point of comparison for your buying decision.

The cheapest of the 9-ppm to 20-ppm printers in this buyers' guide retails for $995—comparable in price to many personal laser printers. If you're willing to spend $5995 or more, you can break the 17-ppm barrier, but not every network needs this kind of high-end

PETER HOEY

BY DANIEL MILES KEHOE

performance. Speed and price, however, are only a couple of issues to consider when buying one of these printers.

Printer Speed

Engine speed provides only a rough guide to a printer's potential performance. While a printer never runs faster than its rated engine speed, it often runs slower while its controller is mapping fonts and rasterizing images. A fast 15- to 17-ppm engine will ably handle text output, while a fast RISC processor will help out on graphics. Both Canon and Toshiba ship 17-ppm engines; Kodak, Sharp, Matsushita, and Xerox offer 15- or 16-ppm engines. Generally, four users with simple printing needs will be content with a standard 8-ppm printer. Work groups of six users will need a printer with an engine speed in the 9- to 14-ppm range. If eight or more users share a printer, don't consider anything slower than 15 ppm.

RISC processors such as the AMD 29000 are well matched to fast print engines. It's misleading to compare processor speed (in MHz) among different printers, as printer manufacturers base controller designs on a variety of RISC architectures. As a rule of thumb, any RISC controller is faster than the more common Motorola 68000–based controllers. Weitek, Intel, AMD, and National Semiconductor make commonly used RISC processors.

More memory will also speed your print job by allowing the printer to accept more data faster. It also helps

Network Printing Without the Print Server

Connecting a printer used to be easy: You just plugged it into your PC's parallel port. (Serial port connections were available but introduced slower speeds and COM port hassles.) Hooking a printer to a network required a PC as a dedicated print server—or you would plug into the network's file server.

With the increasingly widespread use of graphical environments such as *Windows* and OS/2, the easy way is becoming the slow way. Documents that incorporate multiple fonts and images produce lengthy print streams. Parallel ports limit the speed at which data can flow to fast RISC-based printer controllers, so printer manufacturers are suggesting that users connect printers directly to network cables, using ethernet, token ring, or Apple EtherTalk interface cards that plug directly into printer controllers.

A number of printer manufacturers offer network cards, notably Hewlett-Packard, QMS, Texas Instruments, Kyocera, ALPS, Lexmark, Xerox, and Toshiba. Typically, these cards offer support for Novell NetWare, DECnet, TCP/IP, AppleTalk, or *LAN Manager* network protocols.

Not only do printer network interfaces speed the transfer of print jobs, they can also save you money. The printer controller becomes its own print server, eliminating the need to dedicate a PC as a print server or force a user to share CPU time with co-workers' lengthy printing tasks. Convenience is also a factor: You can place a printer anywhere there is a network cable; it doesn't have to be within arm's length of a print server PC.

Older printers without network interface cards can still benefit from a network connection via network print server boxes such as the Castelle LANpress, the Intel NetPort, the HP 33480A network connector, and the Microtest LANport. These products plug into the network cable and, in turn, to a printer's parallel port. You won't speed up printing (the parallel port is still a bottleneck), but you'll be able to place printers where they'll do the most good. Some manufacturers (Lexmark, for example) offer private-label versions of these boxes as network interface options—again, expect convenience but no speed gain.

For the simplest printing requirements, automatic port switching or simultaneously active ports permit two or three people to share a printer at the same time without having to use either networking software or a printer switch box—each person simply uses a separate port of the same printer.

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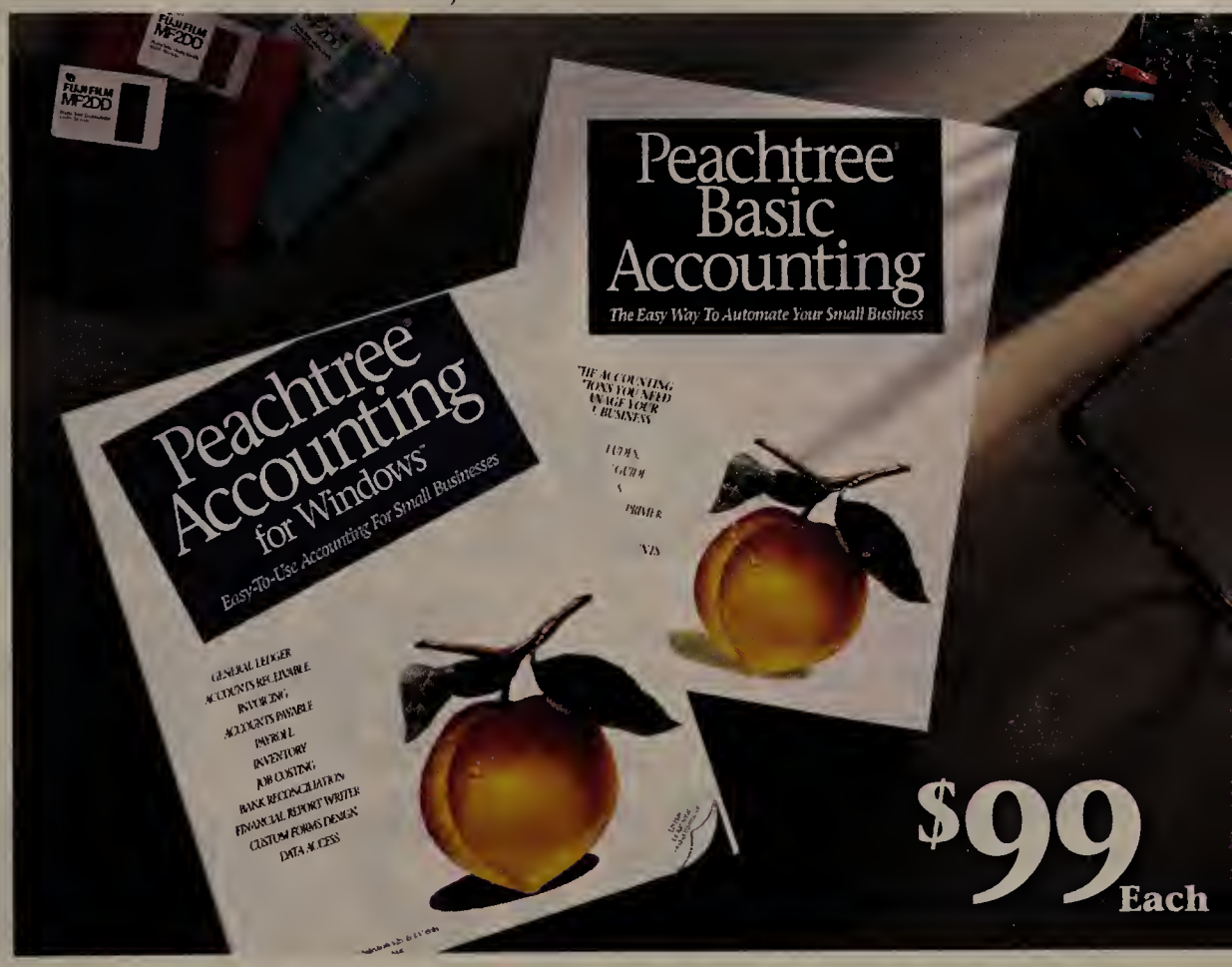

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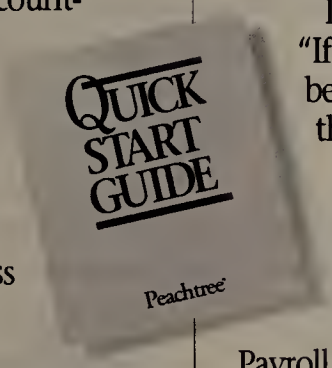

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speed the process of building the output for a complex graphics page within the printer. If you plan to use the printer with many different fonts or for printing a lot of graphics, you should consider purchasing some additional memory. Memory is available for printers in either proprietary form or as standard SIMMs. SIMMs are cheaper than proprietary memory.

Duty Cycles

The more users on your network, and the more jobs they print, the more you should be looking for a sturdy printer. You can gauge sturdiness by the printer's duty cycle, which indicates the recommended maximum number of pages printed per month. The manufacturer's duty cycle rating is not absolute; rather, it represents a manufacturer's rough guide to the printer's capacity when it's heavily used. Printers with duty cycle ratings of 10,000 pages per month are adequate for 6 or fewer users. Printers with ratings of 30,000 pages per month should be able to handle the needs of up to 20 users. Duty cycles of 50,000 pages per month or more on the HP, QMS, ALPS, Olympus, and Toshiba printers deserve note. These printers should handle output volume from more than 20 users.

Connections

The connection between computer and printer forms another potential bottleneck. As engine speed and processor power climb, ordinary parallel ports can limit throughput. Token ring networks run at 4 or 16 megabits per second; ethernet networks communicate data at 10 Mbps. Parallel ports typically achieve data rates of only 200 Kbps to 800 Kbps because they transmit just one byte of data at a time.

Network printer adapters for ethernet and token ring networks bypass the parallel port entirely, hooking a printer's controller directly to a network cable. Several printer manufacturers offer network cards, notably HP, QMS, Texas Instruments, ALPS, Kyocera, Lexmark, Xerox, and Toshiba (see the sidebar "Network Printing Without the Print Server").

Output Quality

No matter how fast the printer, if the output looks lousy you're in trouble. The important factors are the resolution of the print controller and whether it has resolution enhancement. Hewlett-Packard pioneered Resolution Enhancement technology, which tweaks the size of printed dots to smooth edges and improves the look of printed text. Enhanced resolution won't help graphics output as much, however. Remember, the acid test of output quality is still how it looks—whether or not enhanced resolution is involved. Currently printers from HP, Lexmark, Epson, Kyocera, and Toshiba offer enhanced resolution, but other manufacturers are building in similar enhancements.

If you're willing to spend $5995 or more, you can break the 17-ppm barrier, but not every network needs this kind of high-end performance.

The other way to improve output is to pick a printer that delivers a resolution of 400 or 600 dots per inch (dpi). These require more memory and higher processor speeds to maintain performance—and they cost more. If you often print graphics or images using PostScript and need higher quality, choose a 600-dpi printer.

Printer Languages

Work-group printing needs can run the gamut, from PCL to PostScript to plain ASCII output. You should consider the following features: The capability to handle PCL 4 output is essential; PostScript or PCL 5 adds scalable fonts; HP-GL is a plotter mode for CAD applications; an Epson FX/LQ or IBM Proprinter mode lets you print from primitive DOS applications. Printers with an automatic language-switching feature (also known as emulation sensing) have the intelligence to adapt to each job, so you don't have to switch modes manually from within your application. QMS, Epson, Texas Instruments, Lexmark, Qume, Toshiba, Output Technology, HP, and Xerox claim to be language flexible, but you'd be wise to test this feature before you buy—language-switching technology is still in its infancy.

If your printer can print in either the HP PCL or the PostScript languages, another important consideration is whether it accepts standard cartridges for these languages. Cartridges typically add new fonts directly into the hardware, so documents with these fonts print faster. Without the cartridge, the printer needs to be sent descriptions of the fonts along with the other printing information, adding to the amount of data the printer must handle. If a cartridge can add a wide variety of commonly used fonts, it can significantly reduce the amount of time required for print jobs, improving the overall efficiency and throughput of the printer.

Other kinds of cartridges are also available for adding new language emulations or for accelerating the printing process. These are typically proprietary solutions for particular printer models.

Paper Handling

Printers without sufficient paper capacity hinder work-group productivity. There will always be interruptions when a printer runs out of paper, but high-capacity bins will minimize disruption. Look for input bins that handle at least a full 500-sheet ream of paper. Multiple input bins from Kyocera, DEC, Toshiba, Xerox, Olympus, and Lexmark push input capacities

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Work-Group Printers

Manufacturer	Model	List price	Rated engine speed (ppm)	Rated duty cycle (pages per month)	Processor	Text ond grophics resolution (dpi)	Resolution enhonce-ment	Port interfaces: included (optional) [1]
ALPS ELECTRIC (USA)	LSX1600	$3295	16	50,000	68000	300	N	S, P (A, E, T)
DATAPRODUCTS	LZR 960	$2195	9	10,000	Weitek 8200	300	N	S, P, A, SCSI
	LZR 965	$2995	9	10,000	Weitek 8200	300 or 600	N	S, P, A, SCSI
	LZR 1555	$5995	15	30,000	68020 plus ASIC	300 or 400	N	2 S, P
	LZR 1560	$5995	15	30,000	Weitek 8200	300 or 400	N	S, P, A, SCSI
DIGITAL EQUIPMENT	DEClaser 3200	$3599	13	35,000	Intel 80376	300	N	S, P (E)
	DEClaser 3250	$4599	13	35,000	Intel 80376	300	N	S, P (E)
EASTMAN KODAK	Ektaplus 7016	$4495	16	15,000	68010	300	N	S (2), P (2), (A)
	Ektaplus 7016 PS	$5795	16	15,000	68020	300	N	S (2), P (2), (A)
EPSON AMERICA	EPL-8000	$1999	10	5000	68000	300	Y	S (2), P (2), (twin-axial/coaxial)
HEWLETT-PACKARD	LaserJet IIiSi	$5495	17	50,000	AMD 29000	300	Y	S, P (A, E, T)
KYOCERA ELECTRONICS	Ecosys a-Si	$2395	10	30,000	68000	300	Y	S, P (A, E, T)
LEXMARK INT'L	IBM LaserPrinter 10L	$2995	10	20,000	68020	300 or 600	Y	S, P (E, T)
	IBM LaserPrinter 10P	$3795	10	20,000	68020	600	Y	S, P (A, E, T)
MANNESMANN TALLY	MT911	$2595	10	10,000	NS32CG16	300	N	S (4), (P, A)
	MT911PS	$3195	10	10,000	NS32CG16 plus FPU	300	N	S (4), (P, A)
OLYMPUS IMAGE SYSTEMS	Series 2000	$5995	20	100,000	68000	300	N	S, P
OUTPUT TECHNOLOGY	LaserMatrix 1000 Model 5	$5495	16	25,000	Intel i960	300	N	S, P (twinaxial/ coaxial)
	LaserMatrix 1000 Model 6	$5995	16	25,000	Intel i960	300	N	S, P (twinaxial/ coaxial)
PANASONIC COMMUNI-CATIONS & SYSTEMS	KX-P4450i Laser Partner	$2095	11	20,000	n/a	300	N	S, P
	KX-P4455 Laser Partner	$2995	11	20,000	n/a	300	N	S, P, A
PENTAX TECHNOLOGIES	LaserFold	$3495	16	n/a	Hitachi	240	N	S, P
PRINTRONIX	L1016	$6995	16	n/a	68030	300	N	S, P (twinaxial/ coaxial)
QMS	QMS-PS 1700	$7995	17	50,000	Intel 80960CA RISC	600	N	S, P, A, SCSI (E, T)
QUME PERIPHERALS	CrystalPrint Express	$3495	12	10,000	Weitek	600 x 300	N	S, P, A
SHARP ELECTRONICS	JX-9500H	$995	9	3000	68000	300	N	S, P
	JX-9700	$2295	16	15,000	68000	300	N	S, P
TANDY/RADIO SHACK	LP990	$1499	9	3000	68000	300	N	S, P
TEXAS INSTRUMENTS	microLaser Plus	$999	9	10,000	68000	300	N	P (S, A)
	microLaser Turbo	$2249	9	10,000	Weitek 8220	300	N	P (S, A, E, T, SCSI)
	microLaser XL	$1749	16	10,000	Weitek 8220	300	N	P (S, A, E, T)
	microLaser XL Turbo	$3649	16	10,000	Weitek 8220	300	N	P, E (S, A)
TOSHIBA AMERICA	PageLaser GX400	$4499	17	50,000	NS32GX32 RISC	300	Y	S, P (A, E, T)
XEROX	4197 MICR	$7895	11	15,000	68000	300	N	S, P
	4213	$4795	13	45,000	Intel 80376	300	N	S, P (A, E, twin-axial/coaxial)

[1] A = AppleTolk, E = ethernet, P = parallel, S = seriol, T = token ring. [2] With option. [3] Continuous feed.

Automatic port switching	Printer languages	Standard/ maximum memory (MB)	Foot-print (square inches)	Toner cartridge life (pages)	Accepts Laser-Jet/PostScript font cartridges	Standard/ maximum input capacity (pages)	Maximum output capacity (pages)	Maximum paper size (inches)	Toll-free tech support	Reader service number
N	PCL 4, PS Level 1 option	1/7	368	10,000	Y/N	750/750	500	8.5 x 14	Y	618
Y	PCL 4, PS Level 2	2/10	192	3000	N/N	250/500	250	8.5 x 14	Y	619
Y	PCL 4, PS Level 2	8/16	192	3000	N/N	250/500	250	8.5 x 14	Y	619
Y	PCL 5, HP-GL, GL/2	4/16	441	12,000	Y/N	250/750	250	11 x 17	Y	619
Y	PCL 4, PS Level 2	4/16	441	12,000	N/N	250/750	250	11 x 17	Y	619
N	PCL 4, PS Level 1 option, DEC ANSI, SIXEL	1/10	557	6000	Y/ [2]	500/2000	500	8.5 x 14	Y	620
N	PCL 4, PS Level 1, DEC ANSI, SIXEL, TEK4010/4014	7/10	557	6000	Y/Y	500/2000	500	8.5 x 14	Y	620
N	PCL 4, HP-GL, Proprinter, Diablo 630, Epson	2/4	305	4000	N/N	500/500	500	8.5 x 14	Y	621
N	PCL 4, PS Level 1, HP-GL, Proprinter, Diablo 630, Epson	6/6	305	4000	N/N	500/500	500	8.5 x 14	Y	621
Y	PCL 5, PS Level 1 option, HP-GL option, Epson	1/7.5	284	8000	Y/ [2]	250/500	150	8.5 x 14	Y	622
N	PCL 5, PS Level 1 option, HP-GL	1/17	510	8000	Y/N	1000/1000	500	8.5 x 14	N	623
Y	PCL 5, PS Level 1 option, HP-GL, Proprinter, Diablo 630, Epson	1/5	188	5000	N/N	250/1250	750	11 x 14	Y	624
N	PCL 4, PCL 5 option, PS Level 1 option, HP-GL, PPDS	1/9	293	15,000	N/N	700/800	250	11 x 14	N	625
N	PCL 4, PCL 5 option, PS Level 1, HP-GL, PPDS	5/9	293	15,000	N/N	200/800	250	11 x 14	N	625
optional	PCL 4, PS Level 1 option, Epson option	1.5/4.5	251	2000	N/N	700/700	200	8.5 x 14	Y	626
optional	PCL 4, Microsoft PS, Epson option	2.5/4.5	251	2000	N/N	200/700	200	8.5 x 14	Y	626
N	PCL 4, Proprinter, Epson	2.5/5.5	n/a	12,500	Y/N	500/1000	1500	8.5 x 14	Y	627
N	PCL 5	1/9	369	4000	Y/N	n/a / n/a	n/a	8.5 x 33 [3]	Y	628
Y	PCL 5, PS Level 1	1/9	369	4000	Y/N	n/a / n/a	n/a	8.5 x 33 [3]	Y	628
N	PCL 4, Epson	0.5/4.5	476	3000	N/N	500/500	250	8.5 x 14	Y	629
N	PCL 4, PS Level 1	2/4	476	3000	N/N	500/500	250	8.5 x 14	Y	629
N	Epson	32K/32K	369	4000	N/N	n/a / n/a	n/a	[3]	N	630
N	PS Level 1 option, Proprinter, line printer	8/24	400	4000	N/N	n/a / n/a	n/a	[3]	Y	631
Y	PCL 4, PS Level 1, HP-GL, CCITT group IV, DEC LNO3 option	8/32	484	8000	Y/Y	1000/1000	600	8.5 x 14	N	632
N	PCL 4, PS Level 1	3/8	295	7500	N/N	500/500	100	8.5 x 14	N	633
N	PCL 4, Proprinter, Diablo 630, Epson	0.5/4.5	190	3000	N/N	250/500	230	8.5 x 14	Y	634
N	PCL 4, Proprinter, Diablo 630, Epson	1/5	262	5000	N/N	250/750	250	8.5 x 14	Y	634
N	PCL 4, Proprinter, Diablo 630, Epson	0.5/2	190	3000	N/N	250/250	250	8.5 x 14	N	635
N	PCL 4, PS Level 1 option, Epson	0.5/4.5	190	3000	Y/ [2]	250/500	250	8.5 x 14	N	636
Y	PCL 4, PS Level 2, Epson	2.5/10.5	190	3000	Y/Y	250/500	250	8.5 x 14	N	636
N	PCL 4, PS Level 2 option, Epson	0.5/4.5	262	6000	Y/ [2]	250/500	250	8.5 x 14	N	636
Y	PCL 4, PS Level 2, Epson	2.5/10.5	262	6000	Y/Y	250/500	250	8.5 x 14	N	636
N	PCL 5, PS Level 1 option, Proprinter	1/9	342	13,000	Y/Y	500/2100	1950 [2]	11 x 17	N	637
Y	PCL 4, PS Level 2 option, HP-GL, Proprinter, Diablo 630, Xerox XES, Epson	1/5	287	8000	N/Y	500/500	450	8.5 x 14	Y	638
Y	PCL 4, PS Level 1 option, HP-GL, Xerox XES	0.5/10.5	354	6500	Y/Y	500/2000	500	8.5 x 14	Y	638

For more information about all products in this table, circle reader service no. 902.

over the 1000-sheet mark. Output trays need not match the capacity of input bins if users pick up their jobs quickly, but offset stacking separates documents in the output tray and makes it easier to retrieve work. Printers from HP and QMS offer this feature. The Toshiba PageLaser GX400 goes one better and offers an optional 10-bin sorter.

All these printers will print envelopes and legal-size paper through either an adjustable tray or an optional bin. Moreover, specialized paper handling is becoming more affordable. Printers from Dataproducts and Toshiba accommodate 11-by-17-inch pages at prices comparable to the HP LaserJet IIISi's.

Duplexing, or printing on both the front and back of a page, is available as an option for HP, Kyocera, and QMS printers and is included as standard with DEC and Toshiba printers. Continuous form printing is featured on printers from Output Technology, Printronix, and Pentax.

Generally, four users with simple printing needs will be content with a standard 8-ppm printer. For eight users or more, don't consider anything slower than 15 ppm.

Additional features add convenience. The Eastman Kodak Ektaplus 7016PS is a hybrid laser printer and photocopier. Printers that offer integrated toner cartridges, like the design popularized by HP, reduce the mess of changing the toner, the developer, and the imaging drum when consumables run out. Then there's Kyocera's new Ecosys a-Si printer, which uses a new amorphous silicon imaging drum that is much sturdier than traditional metal drums and lasts much longer.

Your printer may need extra memory for PostScript or downloaded fonts; 1.5MB is the bare minimum for PostScript, and 3MB is more comfortable for a 300-dpi letter-size page with a few extra fonts. You'll save money if the manufacturer lets you upgrade with standard DRAM chips or SIMMs.

Price

At $995 to $1499, the 9-ppm printers from Sharp, Texas Instruments, and Tandy/Radio Shack barely qualify as work-group printers. At $7995, the fast 600-dpi QMS-PS 1700 commands a premium. Somewhere within this range lies a printer that delivers the right balance of features for your work group.

Daniel Miles Kehoe has written about laser printers for PC World *for four years. He is a contributing editor for* NeXTworld *magazine.*

WHERE TO BUY

ALPS Electric (USA) Inc.
3553 N. First St.
San Jase, CA 95134
408/432-6000,
408/432-8337 (fax)

Dataproducts Corp.
6219 De Sato Ave.
Woadland Hills, CA
91365-0746
800/334-3174,
818/887-8000

Digital Equipment Corp.
146 Main St.
MailStop MLO
Maynard, MA
01754-2571
800/344-4825,
800/234-2298 (fax)

Eastman Kodak Co.
Printer Products
901 Elmgrave Rd.
Rachester, NY 14653
800/344-0006,
716/726-3108 (fax)

Epson America Inc.
20770 Madrona Ave.
Torrance, CA 90509
800/922-8911,
310/782-0770

Hewlett-Packard Co.
19310 Pruneridge Ave.
Cupertino, CA 95014
800/752-0900,
208/344-4809 (fax)

Kyocera Electronics, Inc.
100 Randalph Rd.
Samerset, NJ 08875
800/323-0470,
908/560-3400

Lexmark Int'l, Inc.
740 New Circle Rd.
Lexingtan, KY 40511
800/358-5835

Mannesmann Tally
8301 S. 180th St.
P.O. Bax 97018
Kent, WA 98064-9718
800/843-1347,
206/251-5500

Olympus Image Systems, Inc.
15271 Barranca Pkwy.
Irvine, CA 92718-2201
714/753-5935,
714/453-4425 (fax)

Output Technology Corp.
2310 N. Fancher Rd.
Spakane, WA
99212-1381
800/468-8788,
509/536-0468

Panasonic Communications and Systems Co.
2 Panasonic Way
Secaucus, NJ 07094
800/742-8086,
201/348-7000

Pentax Technologies Corp.
100 Technalagy Dr.
Braamfield, CO 80021
303/460-1600,
303/460-1628 (fax)

Printronix
17500 Cartwright Rd.
P.O. Bax 19559
Irvine, CA 92713-9559
800/826-3874,
714/863-1900

QMS Inc.
One Magnum Pass
Mabile, AL 36618
800/631-2692,
205/633-4300

Qume Peripherals Inc.
260 S. Milpitas Blvd.
Milpitas, CA 95005
800/457-4447,
408/942-4200 (fax)

Sharp Electronics Corp.
Copier and Imaging
Divisian
Sharp Plaza
Mahwah NJ 07430-2135
800/237-4277,
201/529-8200

Tandy Corp./Radio Shack
Cantact a local Radio
Shack stare ar dealer

Texas Instruments
P.O. Bax 202230
Austin, TX 78720-2230
800/527-3500

Toshiba America Information Systems, Inc.
Electranic Imaging Divisian
9740 Irvine Blvd.
Irvine, CA 92718
800/468-6744

Xerox Corp.
800 Lang Ridge Rd.
P.O. Box 1600
Stamford, CT
06904-1600
800/334-6200

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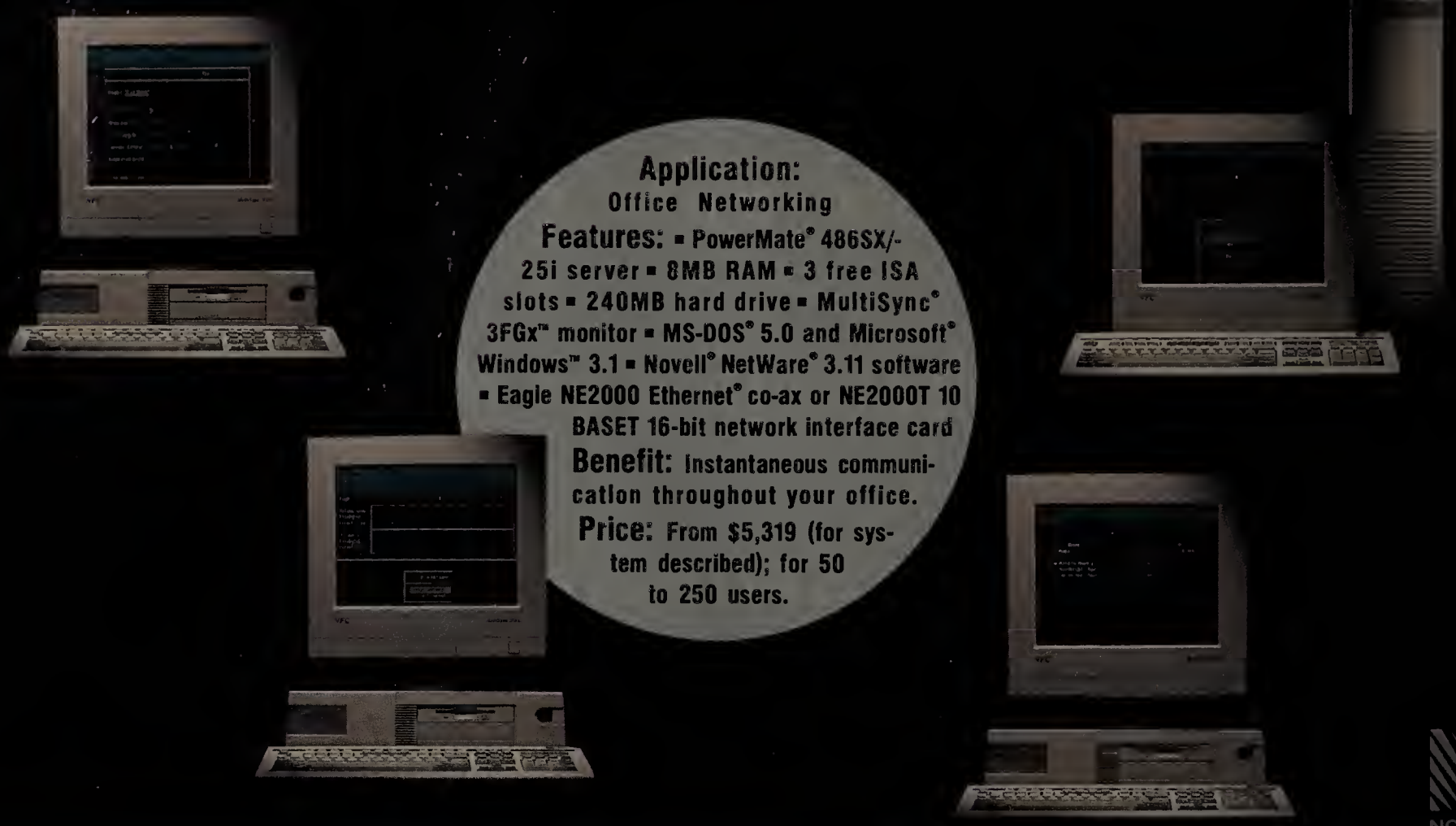


Application:
Office Networking

Features: ▪ PowerMate® 486SX/-25i server ▪ 8MB RAM ▪ 3 free ISA slots ▪ 240MB hard drive ▪ MultiSync® 3FGx™ monitor ▪ MS-DOS® 5.0 and Microsoft® Windows™ 3.1 ▪ Novell® NetWare® 3.11 software ▪ Eagle NE2000 Ethernet® co-ax or NE2000T 10 BASET 16-bit network interface card

Benefit: Instantaneous communication throughout your office.

Price: From $5,319 (for system described); for 50 to 250 users.

■ Select Solution No. 18 NEC / Aldus

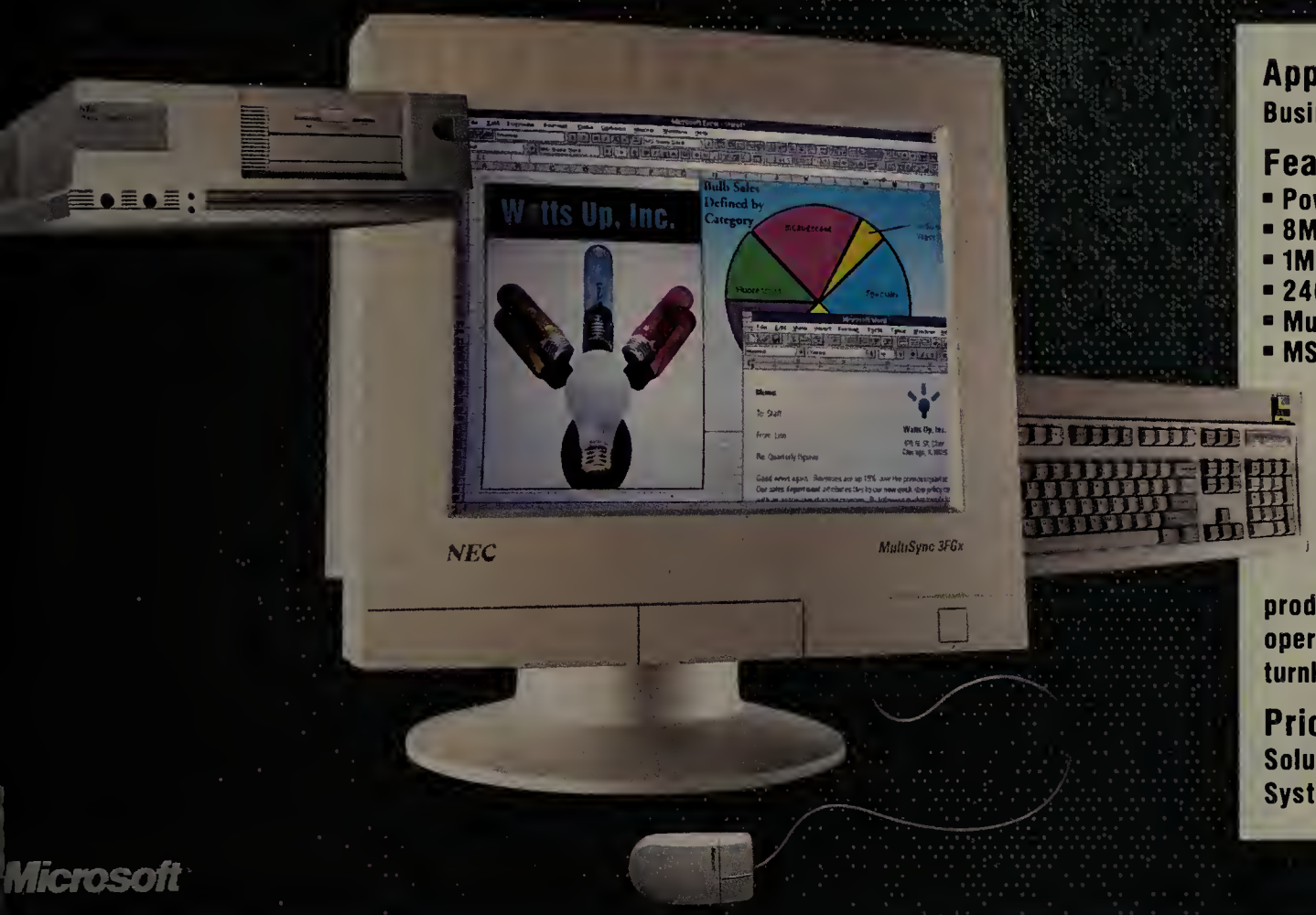
Application:
Desktop Publishing

Features:
- PowerMate® 486/50i
- 8MB RAM
- 1MB Video DRAM
- 240MB hard drive
- MultiSync® 5FG™ monitor
- Matrox® Impression 1024™ Color Graphics Board
- MS-DOS® 5.0 and Microsoft® Windows™ 3.1
- Aldus FreeHand® 3.1, PageMaker® 4.0, PhotoStyler™ 1.1a
- Microsoft Office for Windows (Microsoft Excel 4.0, Word 2.0, PowerPoint® 3.0)

Benefit: High-performance integration of text and graphics. Right out of the box.

Price: Select DTP Solutions from $3,819. System shown: $6,979.

■ Select Solution No. 9 NEC / Microsoft



Application:
Business Computing

Features:
- PowerMate® 486/50i
- 8MB RAM
- 1MB Video DRAM
- 240MB hard drive
- MultiSync® 3FGx™ monitor
- MS-DOS® 5.0 and Microsoft® Windows™ 3.1
- Microsoft Office for Windows (Microsoft Excel 4.0, Word 2.0, PowerPoint® 3.0)

Benefit: Increased productivity in the Windows operating environment. In a turnkey, ready-to-work system.

Price: Select Business Solutions from $2,739. System shown: $3,649.

Microsoft

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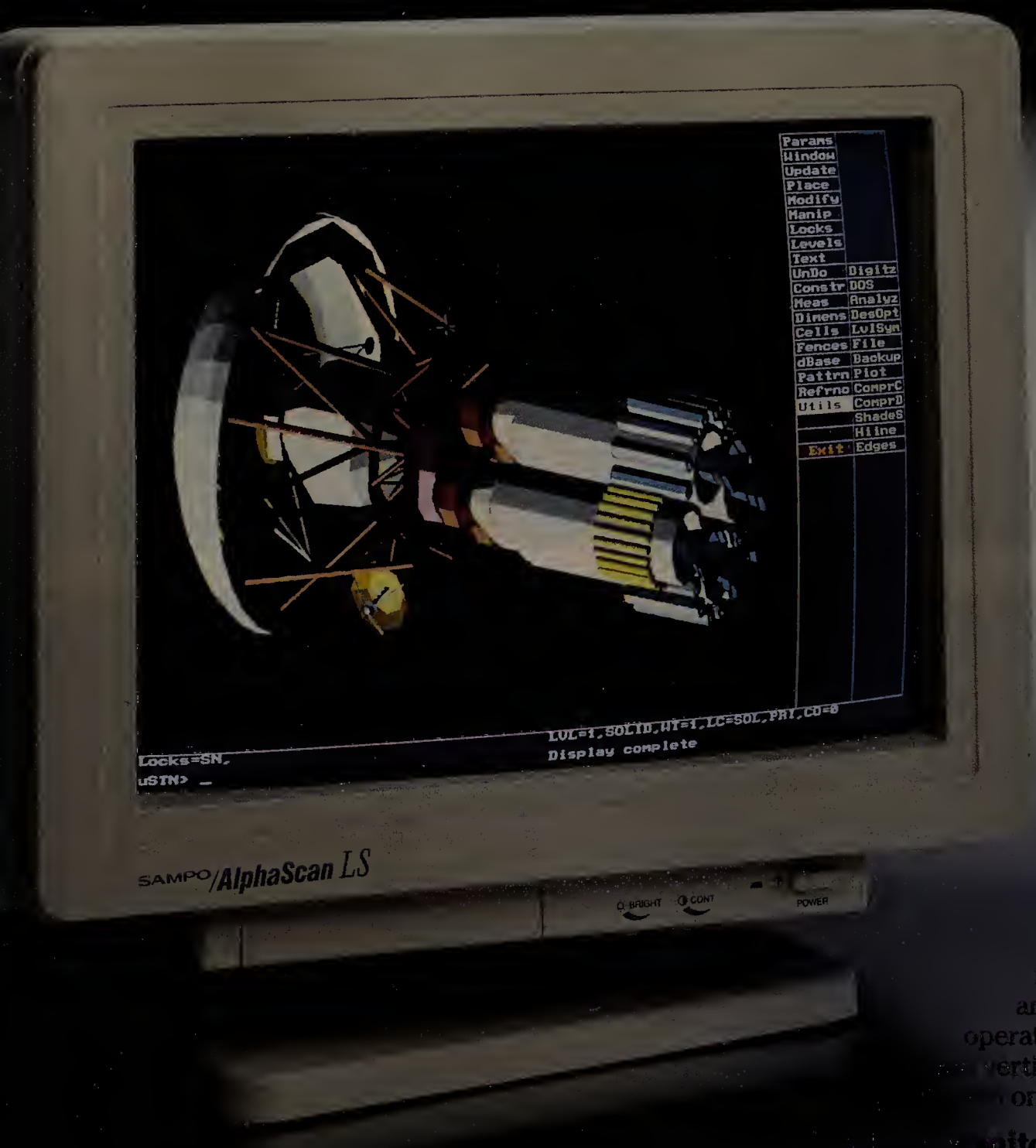

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CAD Software Under $1000

Need a slick way to plan office space? How about a tool that helps clients visualize a new product? More than just drafting packages, these 30 CAD programs can deliver precision drawing for a host of applications.

GORDON STUDER

Computer-aided design software has heavy-duty hardware demands: a fast CPU, lots of RAM, a math coprocessor, a high-resolution graphics board, a big monitor, a mouse or digitizer . . . .

Sound familiar? Most of those hardware requirements have already become standard with *Windows.* Now anyone with a computer capable of running *Windows* in enhanced mode can run any CAD package. And because the 486DX CPU has a built-in math coprocessor, even the math chip is becoming less of an issue as these systems enter the workplace.

Long regarded as tools for rocket scientists and engineers, top-of-the-line CAD programs offer hardware-intensive features such as rendering and have traditionally carried prices to match—the newest release of *AutoCAD,* for example, costs $3750. However, a new generation of low-cost CAD software is aimed squarely at the user who needs only the special features

BY RALPH GRABOWSKI

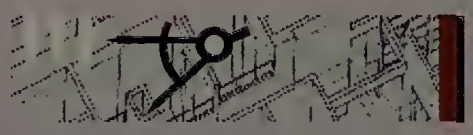
that take CAD a step beyond sophisticated drawing packages. In this buyers' guide, we've gathered 30 such low-cost CAD packages that retail for less than $1000, and some are available for less than $100.

THE CAD DIFFERENCE

What is it about computer-aided design and drafting software that makes it different from high-end draw programs such as *Micrografx Designer* and *CorelDraw?* Like these programs, all the CAD packages listed in the accompanying table come with basic 2-D draw-type tools for creating lines, arcs, circles, text, and curves; most of them let you copy, rotate, or move objects and hatch fill areas with patterns. But CAD programs also offer intelligent objects, much greater precision, specialized drafting tools, and sometimes even a built-in programming language.

When you create drawings with CAD software, the

Low-Cost CAD Programs



Manufacturer	Product	List price	Operating system	Math chip needed	RAM recommended	Disk space needed	Network support	Windows or viewports [1]	Maximum layers [1]	Levels of undo [2]
Under $1000										
AMERICAN SMALL BUSINESS COMPUTERS	DesignCAD Professional 1.0	$995.95	DOS	N	2MB EMS	6MB	Y	6	62	full/d
	DesignCAD 2D 5.0	$349.95	DOS	N	2MB EMS	3MB	Y	6	62	full/d
	DesignCAD 3D 4.0	$499.95	DOS	N	2MB EMS	6MB	Y	4	62	full/d
	VinylCAD 1.1	$799.95	DOS	N	2MB EMS	7MB	Y	1	62	full/d
ARCHWAY SYSTEMS	PenDrafter 7.0	$595	DOS [4]	N	2MB EMS	5MB	Y	30	250	1
AUTODESK RETAIL PRODUCTS	AutoSketch 3.1 DOS	$249	DOS	N	2MB EMS or XMS	4MB	N	1	10	full/d
	AutoSketch 1.0 Windows	$299	Windows	N	3MB EMS	4MB	N	2	10	full/d
	GenCADD Series 6.0	$990	DOS	N	2MB EMS or XMS	4MB	N	1	256	25
	Generic CADD 6.0	$495	DOS	N	1MB EMS or XMS	4MB	Y	12	256	25
	Office Layout 1.0	$149.95	DOS	N	3MB EMS	3MB	N	1	5	25
CADKEY	Cadkey Light 4.0	$395	DOS	N	1MB EMS	4MB	N	4	256	0
	DataCAD 128 1.0	$349	DOS	Y	n/a	2.5MB	N	1	1000	1
COMPUTERVISION	DesignView 3.0	$995	Windows	N	4MB EMS	2.5MB	Windows	d/r	20	1
DITEK INT'L	DynaCADD 2.04	$495	DOS	N	4MB EMS	2MB	N	4	256	1
EVOLUTION COMPUTING	EasyCAD2 2.72	$199	DOS	N	1MB EMS	600K	N	1	256	1
	FastCAD 2D 2.72	$795	DOS	Y	1MB EMS	800K	N	8	256	1
FORESIGHT RESOURCES	Drafix CAD Ultra 4.2	$395	DOS	N	2MB XMS	4.5MB	Y	1	256	100
	Drafix Windows CAD 2.1	$695	Windows	N	4MB XMS	5MB	Windows	4	256	16
IMSI	TurboCAD 1.8	$149.95	DOS	n/a	640K	1MB	N	1	128	1
MEGA CADD	MegaModel/386 3.03	$795	DOS	Y	4MB–8MB XMS	4MB	Y	4	55	1
ROBO SYSTEMS INT'L	RoboCAD Sketchpad 2.1	$295	DOS	N	1MB EMS or 2MB XMS	3MB	Y	16	10	full/d
SCHROFF DEVELOPMENT	Silverscreen 2.14	$495	DOS	Y	4MB XMS	5MB	Y	d/r	d/r	full/d
	Silverscreen 2.14X	$795	DOS	Y	6MB–8MB XMS	5MB	Y	d/r	d/r	full/d
Under $100										
AMERICAN SMALL BUSINESS COMPUTERS	ModelCAD 2.0	$99.95	DOS	N	640K	2MB	Y	1	16	full/d
AUTODESK RETAIL PRODUCTS	The Home Series 1.0 [6]	$59.95	DOS	N	2MB EMS	2MB	N	n/a	varies [6]	25
NATURAL SOFTWARE	PC-Draft-CAD 3.06	$65	DOS	N	1MB EMS or XMS	800K	Y	1	d/r	full/d
RAIR COMPUTER	myHouse 1.0	$99	DOS	N	1MB EMS	3MB	N	2	17	0
SAYET	LaserCAD Apprentice 5.1	$39.95	DOS	N	640K	720K	Y	1	1024	1
	LaserCAD Professional 5.1	$69.95	DOS	N	640K	720K	Y	1	1024	1
TRIUS	DraftChoice 2.0	$69	DOS	N	1MB EMS	300K	Y	1	256	100+

[1] d/r = limited only by disk space or available RAM.
[2] full/d = full undo limited only by disk space.
[3] wf = wireframe, sur = surface, sol = solid, z-coor = z-coordinate, auto-iso = auto-isometric.
[4] PenDOS optional.
[5] Five symbols libraries available.

program stores those objects as a collection of algorithms that describe lines, shapes, fills, and so on, rather than as bit-mapped images, which describe every pixel in an image (paint packages and scanned image files use bit-mapped formats). Working with vector drawings is faster, requires a smaller amount of disk space, and enables you to display clear images at any size no matter what the resolution of your monitor.

Objects created using the CAD programs are "intelligent." A line, for example, is not simply stored as a line; instead, a CAD program stores the coordinates of the line's endpoints—along with its characteristics, such as the color, width, thickness, and style—and associates real-world dimensions with the line. That makes it a snap for the CAD package to tell you the exact length of the line or the distance between two points on it.

										FILE IMPORT/EXPORT		ATTRIBUTE IMPORT/EXPORT		
Macros/ programming language	3-D modeling tools [3]	Symbols supplied	Free-hand sketch	Parallel lines	Boxes	Line types supplied/ definable	Hatch patterns supplied/ definable	Text fonts supplied/ definable	Associative dimensioning	DXF	Text	In	Out	Reader service number
Y/Y	wf, sur, sol	6700	Y	N	N	8/N	40/Y	20/Y	Y	Y	I/O	none	CDF, QIF	639
Y/Y	none	500	Y	N	N	8/N	40/Y	20/Y	Y	Y	I/O	none	CDF	639
Y/Y	wf, sur, sol	0	Y	N	N	1/N	0/N	20/Y	Y	Y	I/O	none	CDF	639
Y/Y	none	0	Y	N	N	8/N	40/Y	50/Y	Y	Y	I/O	none	CDF	639
Y/Y	z-coor, auto-iso	0	N	N	Y	8/Y	16/Y	12/Y	Y	Y	I/O	ASCII, SDF, CDF	ASCII	640
Y/N	none	0	N	N	Y	10/N	50/Y	20/Y	Y	Y	I/O	none	none	641
Y/N	none	2200+	N	N	Y	10/N	162/Y	24/Y	Y	Y	I/O	none	none	641
Y/N	none	varies [5]	N	Y	Y	10/N	17/Y	6/Y	Y	Y	I/O	WK1	WK1	641
Y/Y	none	500	N	Y	N	10/N	50/Y	35/Y	Y	Y	I/O	WK1	WK1	641
N/N	none	200	Y	Y	Y	4/N	0/N	1/N	Y	Y	out	none	EPS, WK1, DBF, CDF, ASCII	641
N/N	wf	15	N	N	N	4/N	15/N	2/N	Y	Y	N	none	none	642
Y/N	wf, sur, sol	489	Y	N	N	24/Y	49/Y	5/Y	Y	Y	in	none	ASCII	642
N/N	none	0	N	N	N	7/N	5/N	1/N	Y	Y	I/O	none	SDF, CDF, DBF, WKx, XLS	643
Y/N	wf	0	N	N	Y	12/Y	15/Y	14/Y	N	Y	N	none	none	644
Y/Y	none	0	N	N	Y	16/Y	24/Y	5/N	Y	Y	in	none	none	645
Y/Y	none	0	N	N	Y	16/Y	24/Y	5/N	Y	Y	in	none	none	645
Y/N	none	400+	Y	Y	N	9/N	15/N	19/N	Y	Y	I/O	none	SDF, CDF, DBF	646
Y/Y	none	400+	Y	Y	N	9/N	15/N	19/N	Y	Y	I/O	none	SDF, CDF, DBF, XLS	646
Y/N	none	230	Y	Y	N	9/Y	1/Y	8/N	Y	Y	N	none	none	647
N/N	wf, sur	0	N	N	N	1/N	0/N	1/N	N	Y	N	DXF	DXF	648
N/N	none	100+	Y	Y	N	8/N	64/N	24/Y	Y	N	I/O	ASCII, generic WP	SDF, CDF, WKx	649
Y/N	wf, sur, sol	38	N	N	N	9/Y	38/Y	6/Y	Y	Y	I/O	SDF, CDF, DBF, ASCII	SDF, CDF, DBF, ASCII	650
Y/Y	wf, sur, sol	38	N	N	N	9/Y	38/Y	6/Y	Y	Y	I/O	SDF, CDF, DBF, ASCII	SDF, CDF, DBF, ASCII	650
N/N	none	140	N	N	N	8/N	40/Y	16/Y	Y	N	N	none	none	651
N/N	none	varies [6]	N	N	N	1/N	varies [6]	1/N	Y	N	N	none	Generic CADD 6.0	652
Y/N	none	125	N	N	Y	8/N	18/Y	5/N	N	import	I/O	none	none	653
N/N	wf, sur, sol	300	N	N	N	8/Y	0/N	2/N	Y	N	N	none	DXF	654
N/N	none	122	Y	N	N	12/N	38/Y	4/Y	N	Y	I/O	none	none	655
N/N	none	260	Y	N	N	12/N	140/Y	4/Y	N	Y	I/O	SDF, CDF	SDF, CDF	655
Y/N	none	200+	Y	N	Y	14/Y	13/Y	6/Y	N	Y	in	none	none	656

[6] Separate packages available for home improvements.

For more information about all products in this table, circle reader service no. 901.

If this isn't exactly your dream house, a salesperson can help you alter the features to meet your needs using a 3-D CAD package.

Most CAD packages also allow you to add information (called *attributes*) that you define and store with the objects. For example, if you're doing an inventory of your office furniture and draw an office desk as a symbol, you can define such attributes as manufacturer, model, and price. You can then extract attribute data and export it to a spreadsheet or data base to total up the number of desks and their cost. Any CAD package listed in the accompanying table that can read DXF files also can use disk-based attribute catalogs, which are now available for things like doors, windows, plumbing, heating, air conditioning, electronics, and landscaping.

Unlike draw programs, where close is good enough, CAD packages cannot tolerate inaccuracy. Two lines that appear to meet on screen may not in fact meet—as you may discover the hard way. To help you out, all CAD packages include *object snap modes* that help you draw precisely (*snap*) to objects and grids. Common object snap modes include the endpoints and midpoint of lines, the center point of circles, and the insertion points of text and symbols.

Finally, some inexpensive CAD packages offer the ultimate tool for automating repetitive tasks: a complete programming language that lets you manipulate entities to change their location, size, or other characteristics. A user-programmed CAD package can, for example, automatically draw dozens of variations on a bolt design or fit a staircase between two floors of a building.

NOT JUST FOR DRAFTING ANYMORE

The new generation of low-cost CAD is showing up in unexpected places. Here are three popular business applications, along with the relevant features you should look for when shopping for an inexpensive CAD package.

Facilities Management

Offices need to keep track of their facilities—buildings, desks, computers, phones, telephone outlets, and so on—for tax depreciation schedules and assigning equipment to personnel. Managing the inventory by tracking the information is called *facilities management*; the problem is *how* to keep track of the inventory.

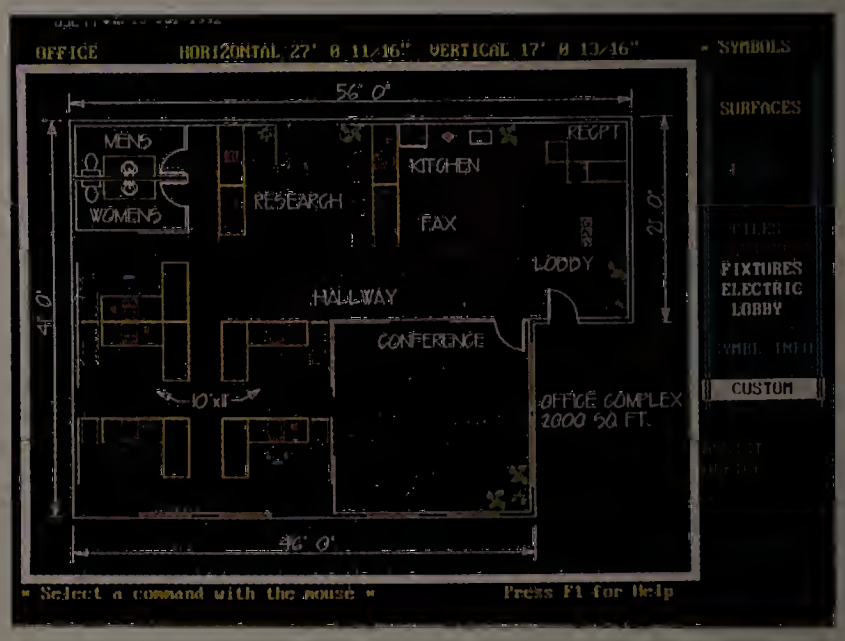
Some forward-looking companies use a data base program linked to a CAD package. All the company's physical inventory is recorded in the data base, while all the office plans are stored as CAD drawings.

When a facilities manager wants to know, say, the location of all 286 or older computers, he or she issues the appropriate query commands to the data base. The data base can print out a report, but a far better solution is to use a third-party add-on software package such as *FMS/AC* that writes the data base information to a DXF file. The CAD program then reads the file to create a graphic display pinpointing the locations of the old computers. Almost all the CAD packages listed in the table can read files in the DXF format.

This solution also works in the reverse. The facilities manager can ask the CAD software to display all the electrical wiring in one wing of the building and then export appropriate attribute information to a data base program to summarize it in a table. CAD packages capable of this feature usually export attribute data in one of the following formats: *dBASE* (DBF), *1-2-3* (WK?), *Microsoft Excel* (XLS), comma-delimited format (CDF—readable by most data base programs), or space-delimited format (SDF—readable by spreadsheets).

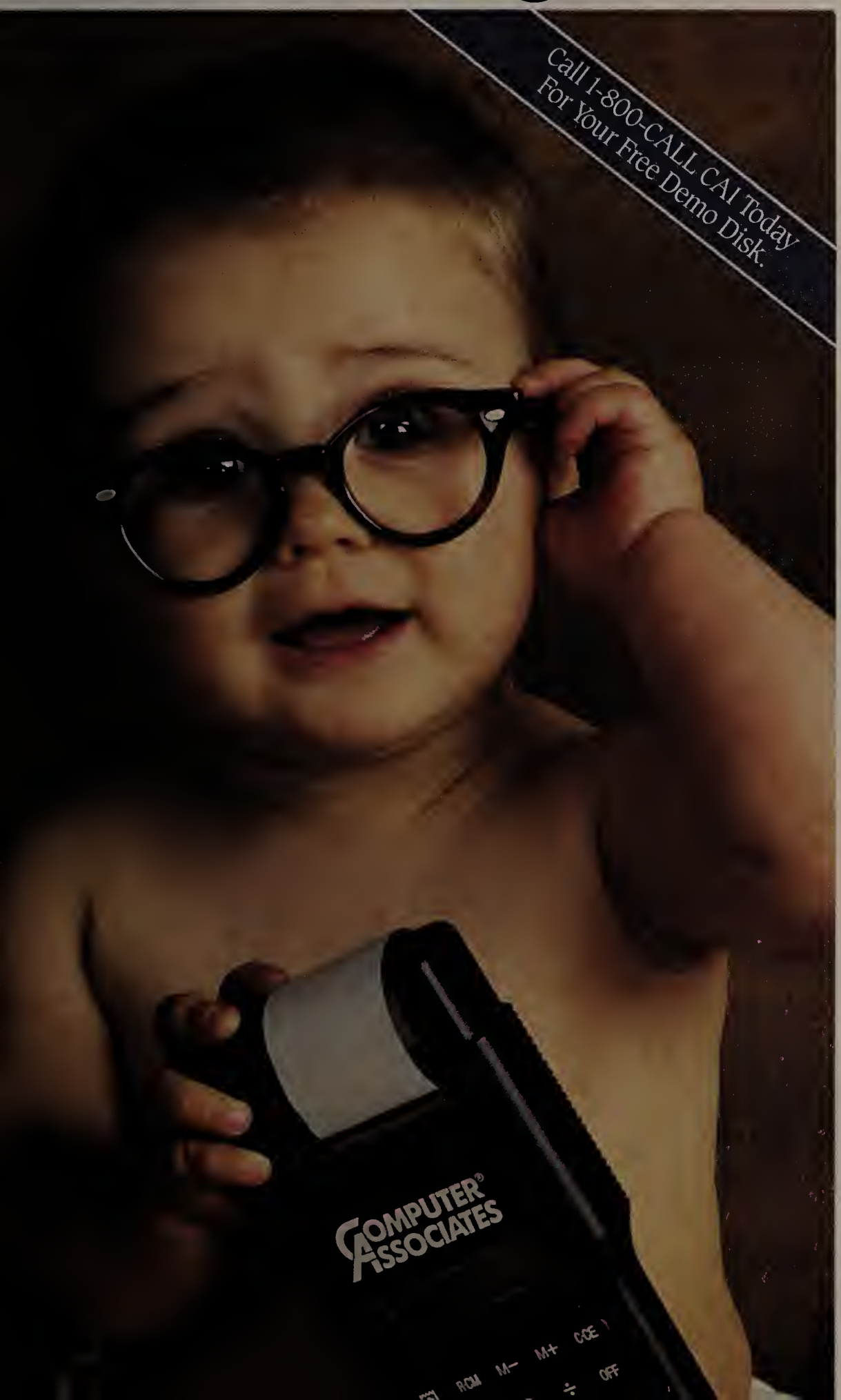
Sales Tool

Some salespeople use high-powered portable computers to take CAD on the road so that they can show potential clients what new products are going to look like or incorporate in-the-field improvements to those products. CAD has even been used by hospital staffs to sell management on the need for new equipment. A street map created with CAD software shows the proximity of po-



Autodesk's Office Layout is a low-cost CAD package that does double duty as a design and facilities management program.

Some People Are Born Accountants. For The Rest Of Us, There's New ACCPAC Simply Accounting For Windows.



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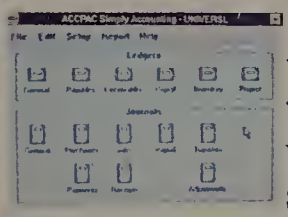

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Circle 29 on reader service card

tential patients, as well as sites of competing hospitals.

Other companies use CAD to help customers visualize products that don't yet exist. Take new home sales: A designer/salesperson can invite customers to sit beside a computer and design their new kitchen, garden, or even an entire home. The designer quickly places cabinets, shrubs, walls, and doors to fit available space. Details like electrical outlets or plumbing facilities appear on differently colored layers; the more complex the design, the more layers are needed. To enable the customers to see different views of the house at the same time, the salesperson opens a number of different windows, or *viewports.* Since many customers have difficulty reading 2-D plans, a CAD package with 3-D capabilities will help bring to life their dream home.

If customers change their mind, CAD makes it easy to move or stretch parts of the plan to different sizes and shapes. CAD programs with *associative dimensioning* automatically update the design to match the changes.

Network Design

As more companies network their computers, the problem is how to document the network—especially as the net spreads across the country.

Since CAD has a practically unlimited drawing surface, it doesn't matter how large the network becomes. As the network evolves into a wide area network (WAN), connecting nodes across the country and even around the world, the drawing can expand to include the additional nodes. With CAD's billion-to-one zoom ratio, you can zoom out to look at the WAN, then zoom in for a detailed look at an individual client location.

If the CAD program lets you attach attributes to the equipment at each node, you can quickly generate data base reports summarizing the state of the network. Links and nodes that are out of commission could be drawn in a different color, while proposed sites could have a different line style. In both cases, maps could quickly be plotted to give repair and installation crews clear working diagrams.

DesignCAD 2D was used to create a wide area network (WAN). Detailed equipment attributes are attached to each node.

If learning CAD still sounds intimidating, note that many packages borrow from the easy interfaces offered by *Windows*-based draw programs. Pulldown menus, point-and-click commands, and context-sensitive help are the norm. The degree of difficulty you'll encounter in learning one of these programs will largely depend on the range of features offered. To minimize your learning curve, select a package with only those features you consider essential to complete your task. And since there's no substitute for actually seeing the program work, ask the company if you can view a demo disk.

Ralph Grabowski is the author of eight books about CAD and the editor of Easy Living Computing. *Ralph telecommutes daily around the world from his home office in Abbotsford, British Columbia.*

WHERE TO BUY

DesignCAD Professional, DesignCAD 2D, DesignCAD 3D, VinylCAD, ModelCAD
American Small Business Computers, Inc.
918/825-4844,
918/825-6359 (fax)

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714/374-0441 (fax)

The Home Series, Generic CADD, GenCADD Series, AutoSketch DOS and Windows, Office Layout
Autodesk Retail Products
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206/485-0021 (fax)

DataCAD, Cadkey Light
Cadkey, Inc.
203/298-8888,
203/298-6401 (fax)

DesignView
Computervision
800/248-7728,
617/868-4658 (fax)

DynaCADD
Ditek Int'l
416/479-1990,
416/479-1882 (fax)

EasyCAD2, FastCAD 2D
Evolution Computing
800/874-4028,
602/967-8633

Drafix Windows CAD, Drafix CAD Ultra
Foresight Resources Corp.
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816/891-8018 (fax)

TurboCAD
International Microcomputer Software Inc.
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415/454-8901 (fax)

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RoboCAD Sketchpad
Robo Systems Int'l Inc.
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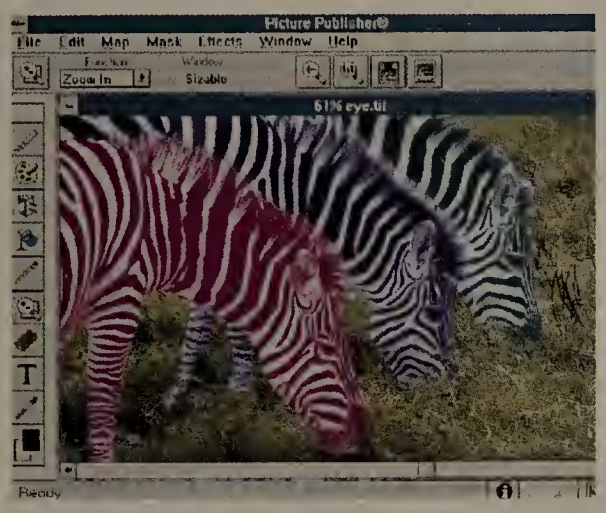

ZOO REVIEW

April Fools Edition — April 1, 1992

Rare zebras added to safari exhibit!

Visitors to the Glendora Zoo will soon be able to view some of nature's oddities in the form of three brightly colored zebras captured reecently in Brigadoon. The zebras are the only known examples of their variety in existence.

"We feel honored to be chosen as the new home for the Brigadoon zebras," said Susan Lyman, manager of the Glendora Zoo. "We've got lots of strange, wild animals living here, but these take the cake."

The Dallas advertising firm of Beckman & Lyman has been selected to handle publicity for the zoo. Its mission will be to translate the current worldwide attention on the zebras into tourist dollars. "There's never been a product we couldn't sell," said Pat Beckman, partner in the firm. "Why not colored zebras?"

The zebras are getting attention not only for the deligbtful hues of their hides, but for other strange characteristics as well. "Their waste products are multicolored," said John Kmnd, a fecal specialist at the Glendora Zoo. "We're looking at marketing the waste as a novelty manure. We're going to call it Hue-Doo."

The zebras were first sighted by noted naturalist and explorer J. Hammond Barrett during an expedition to the Brigadoon outback in 1990. "I thought someone had spraypainted the poor beasts when I first saw them," said Barrett. "But I couldn't imagine where the native cannibals would have gotten spraypaint."

The Brigadoon zebras will remain at the zoo for the indefinite future. Grant Wickes, Director of Reproductive Sciences at the Harrisburg Zoo, hopes to breed the zebras in captivity, and to one day begin returning the animals

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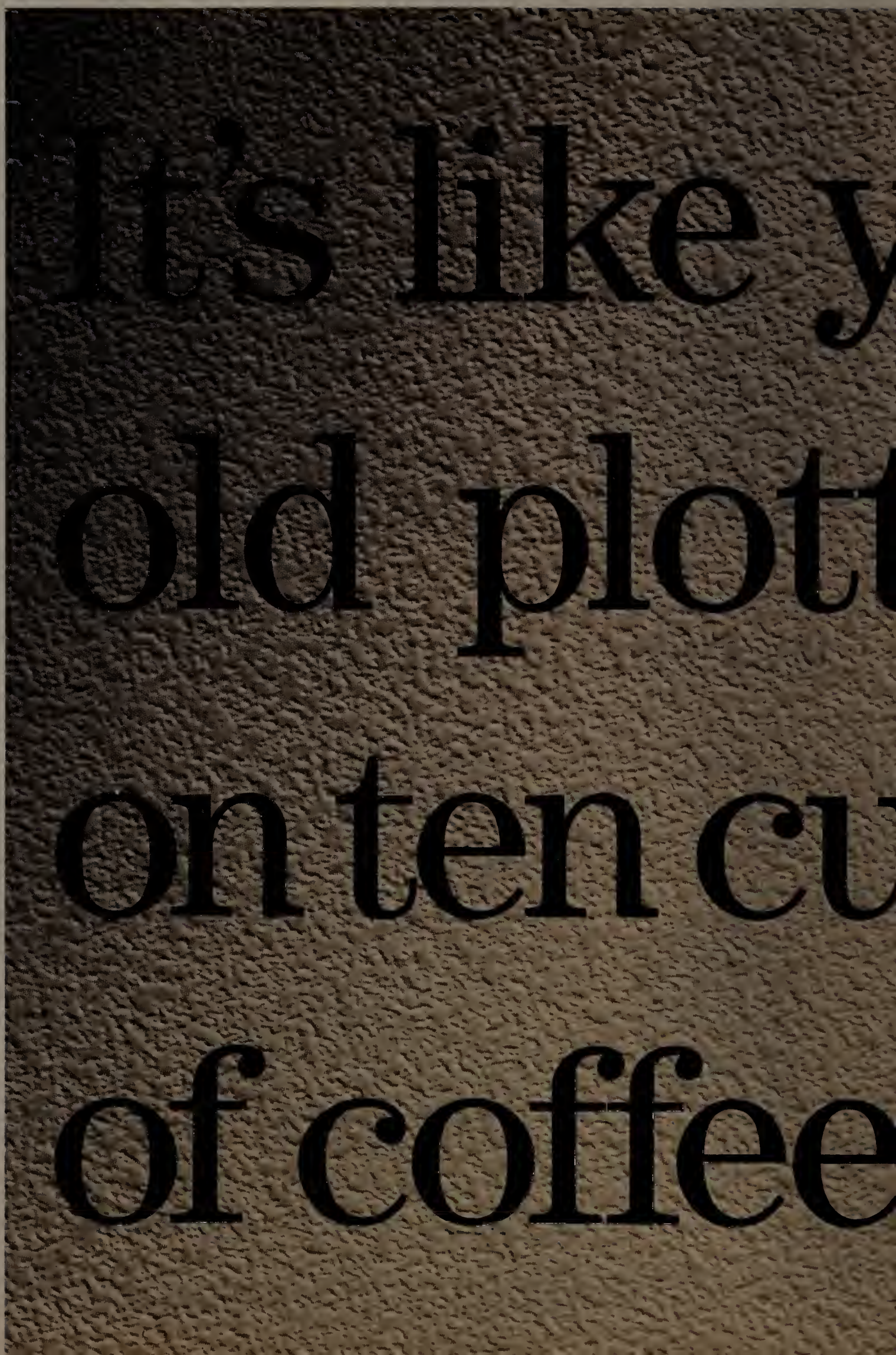
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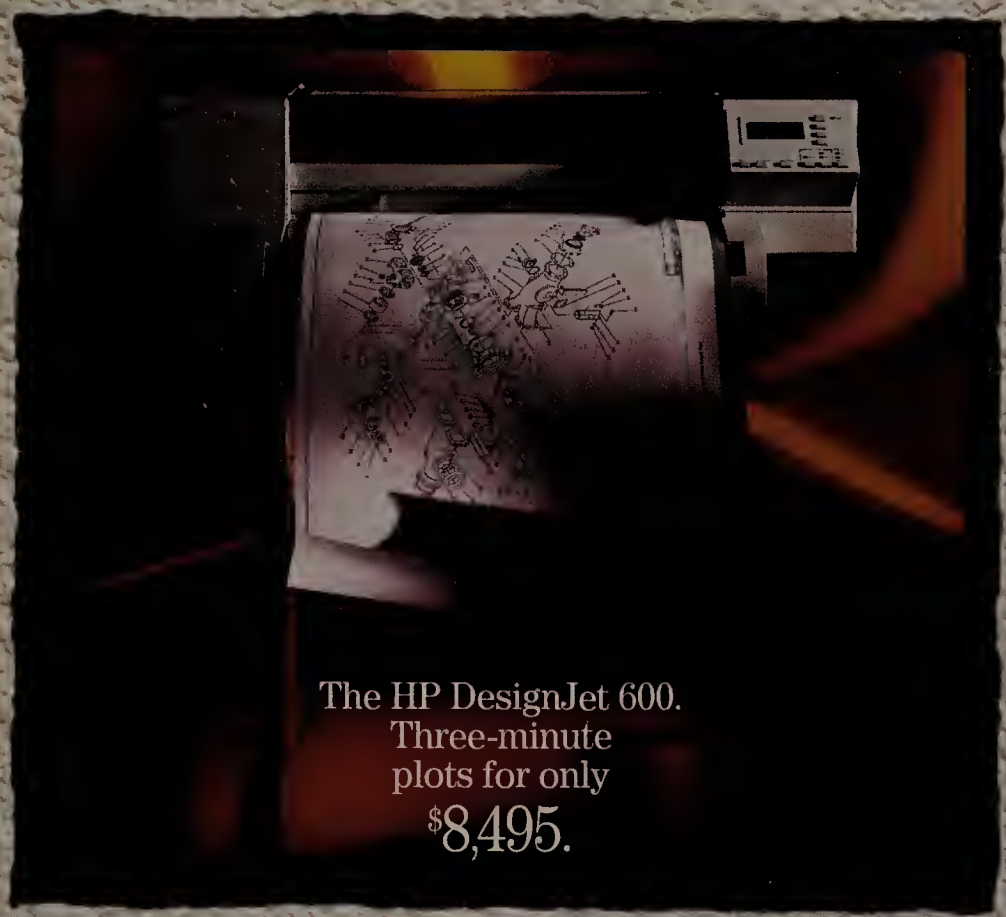

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Because DesignJet 600 plotters use HP's inkjet technology, you get great-looking output quickly and easily. Along with whisper-quiet operation and a choice of commonly available media. DesignJet 600 plotters accept data in HP-GL, HP-GL/2 and HP RTL formats. They give you the option of direct connection to most leading networks. And, of course, they come with the reliability you expect from Hewlett-Packard.

If you're a fast-moving company with a slow-moving plotter, it's about time to wake up and smell the coffee. Call **1-800-752-0900, Ext. 3332** for more information, and ask where you can see an HP DesignJet 600 demo.†

HEWLETT PACKARD

*Suggested U.S. list prices. Plot image courtesy of Autodesk, Inc. HP-GL and HP-GL/2 are trademarks of Hewlett-Packard Company. †In Canada, call 1-800-387-3867, Ext. 3332. © 1992 Hewlett-Packard Company PE12210

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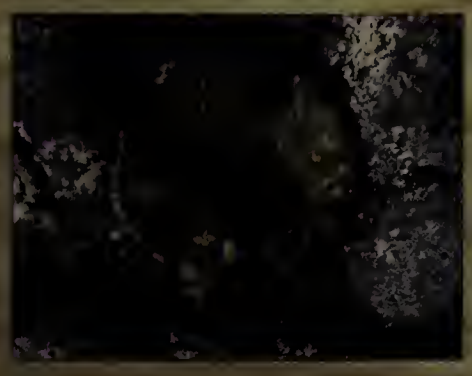
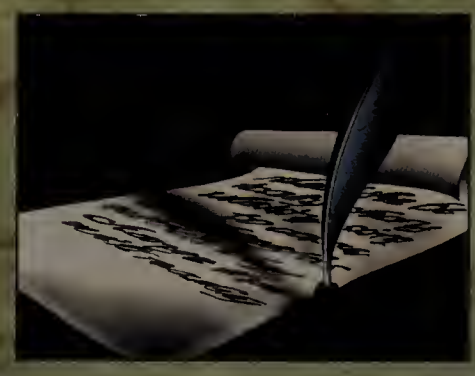
The Evolution of CAD

From the beginning of time, we have tried to express ourselves through graphic

In the beginning of time people had to use primitive design tools for creating any type of graphics.



In the 15th Century design tools were quill ink pens and crude styles of paper.



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By the 18th Century we had advanced to the drafting table with T-squares, and the dreaded eraser.

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THE HELP SCREEN

BY KARL KOESSEL AND ROBERT LAURISTON

PC World offers answers and advice at every level

Q. *We recently installed a scalable-font program on our 386. Now a couple of other programs have problems printing to our LaserJet. Sometimes lines drop from the bottom of a page, pages have only one line on them, or extra, blank pages are mixed into a document. The strange thing is that when I turn the PC and printer off and then on again, these programs print correctly. Is there a better solution?*

S. D. ESCHENBURG
BERLIN, MARYLAND

A. Your new font program is clearly changing some of the settings on your LaserJet but not resetting the printer when it's through. Rather than turn everything off, you can simply reset the LaserJet. Press the printer's Online button to take it off line, then press and hold the Reset button until the LCD window displays 'RESET'.

You can also reset the printer with a batch file. To create RESETLJ.BAT, go to the DOS prompt, type **EDLIN RESETLJ.BAT**, press **<Enter>**, type **I**, press **<Enter>**, type **ECHO** followed by a space, press **<Ctrl>-V**, type **[E > LPT1**, press **<Enter><Ctrl>-C**, type **E**, and press **<Enter>**. (Note that the E in '[E' *must* be uppercase. If your printer is not connected to LPT1, use the appropriate port name.) Move RESETLJ.BAT to a directory listed in AUTOEXEC.BAT's PATH command. From now on, entering RESETLJ at any DOS prompt will send the reset command (Escape E) to the printer, restoring it to its default settings and ejecting any pages left in the printer.

RESETLJ.BAT is coded for LaserJet compatibles. You can easily make one for Epson-compatible dot matrix printers: Just change 'RESETLJ' to **RESETEP**, and replace '[E' with **[@**.

Q. *Every box of floppy disks has the warning, "Do not expose to magnets! Do not expose to excessive heat, cold, or direct sunlight!" Exactly what would happen if I ignored this advice?*

VERNON L. BROOKINS
CHICAGO

A. Magnetic fields, heat, and cold can all render floppy disk data irretrievable. Since data on the disks is encoded magnetically, passing a floppy over or near a magnet, electric transformer, or anything that generates a magnetic field can erase or scramble the data. In offices, magnets are typically found in paper-clip holders and copy stands. Watch out for magnets on key chains, charm bracelets, wallets, and purses too. Don't store disks alongside your monitor, mechanical-bell telephone, electric pencil sharpener, or AC/DC adapter, as the electromagnets inside these devices can emit strong magnetic fields.

Temperatures below 40 degrees Fahrenheit, or above 127 degrees (3½-inch disks) or 140 degrees (5¼-inch disks) can warp or crack a floppy disk's shell or the media inside. Leaving a disk in direct sunlight can heat it past the danger point, as can storing it on a hot PC, monitor, modem, or laser printer. And even when disks are packed out of sight, leaving them in a car in extremely hot or cold weather is dangerous.

Using a disk that's significantly hotter or colder than the air inside your computer can also cause problems. The disk surface expands and contracts according to temperature, slightly changing the location of the disk tracks. Data written to an icy-cold disk may not be readable once it warms up. If you work in a room colder than 50 degrees and experience frequent floppy disk errors, you could try warming your disks up by leaving them in the drive for a few minutes before you use them.

Q. *Our IBM rep says that refresh rate is not as important as the press suggests. Does a video board's refresh rate affect* Windows' *speed?*

SKIP DUEMELAND
BISMARCK, NORTH DAKOTA

A. The vertical refresh rate of a video board indicates the number of times a second it redraws the screen and has no relation to application or system performance. Higher refresh rates are intended to reduce screen flicker and alleviate eyestrain.

Standard VGA boards have a refresh rate of 60 Hz (that is, they redraw the screen 60 times a second). Most people find that rate perfectly acceptable, but many boards still give you the option of displaying VGA at 70 Hz if your monitor can handle it.

Refresh rates really become an issue at higher resolutions. Many video boards reduce their refresh rate when displaying higher resolutions. A lot of people notice a pronounced flicker at 800 by 600 or 1024 by 768 resolution when using a 45-Hz refresh rate. Sometimes you can eliminate such flicker simply by adjusting the room lights and screen colors. If not, switching to a video board with a 60-Hz or 72-Hz refresh rate (if your monitor is able to support the higher rate) usually fixes the problem.

ANTHONY RUSSO

It's not surprising that your IBM rep would try to minimize concerns about refresh rates, since the company's high-resolution adapters and monitors are currently limited to a 45-Hz refresh rate. Despite your rep's dismissal of the issue, IBM takes flicker seriously enough that it's planning to switch to higher refresh rates next year.

Q. *I recently purchased a 386 with a 5¼-inch floppy disk drive. Since we use 3½-inch drives at work, I want to upgrade my home computer so I can transfer files by floppy disk. Which is more cost-effective, an internal or an external drive?*

RHONDA L. HICKMON
HOUSTON

A. Internal drives are much cheaper. If you have a free drive bay, you can simply add a second drive; otherwise, you'll have to replace the existing one with the new drive. You can pick up a 1.44MB 3½-inch drive for $70 or less.

If you don't have a free bay but still want to use both kinds of floppies, replace the existing drive with one of the combination drives listed below. They squeeze both 3½-inch and 5¼-inch drives into a single half-height drive bay.

If you're comfortable working inside your PC, installing a disk drive is relatively simple. First you set a jumper, making the drive A> (to replace the existing drive) or B> (to add a second drive). The drive's instructions will explain this step. Then you plug in the power and data cables. If you're adding a second drive, plug it into the free connector on the ribbon data cable attached to the first drive. Then you secure the drive in the bay, usually with screws along the side, sometimes by fastening tabs at the front. The last step is to run your system's setup program to configure the system for the new drive. (Some older systems require a BIOS upgrade before they can handle 1.44MB drives.)

If that sounds like too much of a challenge, just have a dealer install the drive for you. That should set you back only an additional $50.

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*PrintDirector Gold Turbo printed nearly five times faster than Novell Lite, almost 2 1/2 times faster than ASP Port Authority, about twice as fast as ESI Share Spool and Buffalo SLmkII, and 40% faster than Lantastic. *Based on printing an output file created with Harvard Graphics. Total time for three PCs to print concurrently to two printers.*

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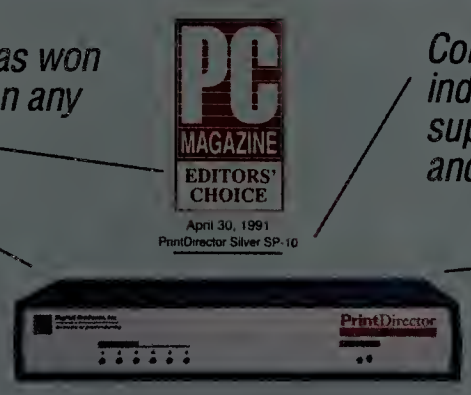

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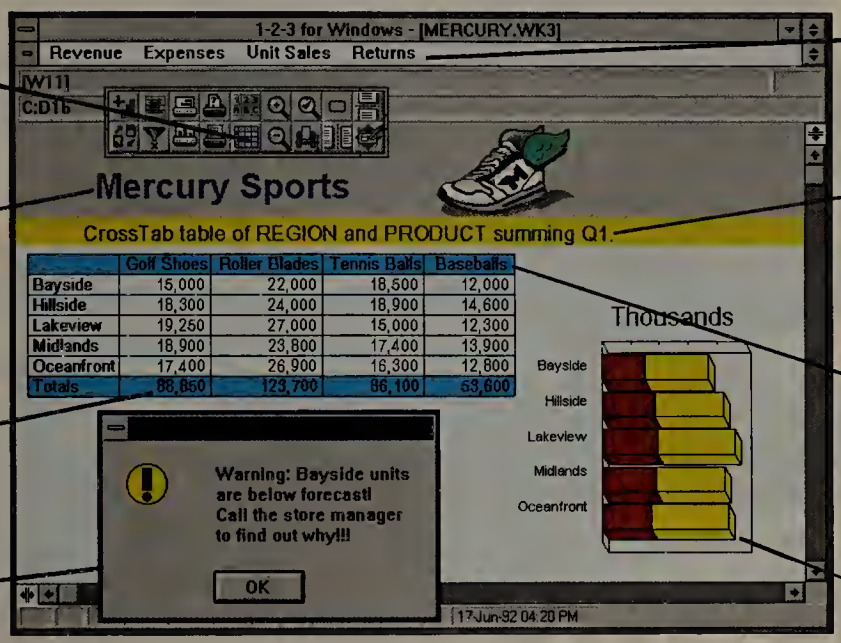

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Lotus 1-2-3 for Windows

*Based on Software Publishers Association data, Q1, 1992, for North America. **This disk is free for current users of 1-2-3 for Windows Release 1.1. New buyers of 1-2-3 for Windows Release 1.1 will find SmartPak in their product package at time of purchase. Network version of 1-2-3 for Windows Release 1.1 is available. Please note that the SmartPak Disk works only with 1-2-3 for Windows Release 1.1. ***Please have credit card and product package ready when you call. **In Canada, call 1-800-GO-LOTUS.** © 1992 Lotus Development Corporation. All rights reserved. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. Classic is a registered trademark licensed to Lotus Development Corporation. SmartPak is a trademark of Lotus Development Corporation. Microsoft is a registered trademark and Windows is a trademark of Microsoft Corporation.

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Reader service no. 611

Q. *I'd like to be able to watch a TV signal on my computer monitor while I'm working. Please tell me if there's a device that will let me do that and where I can get one.*

HARVEY K. POLLACK
FOREST HILLS, NEW YORK

A. You need what's known as a VGA-TV board. As such hybrid boards become more popular, they are also becoming more affordable. Here are eight that list for $500 to $1000. Just run a cable from a camera's, VCR's, or laser disk player's video-out jack to the board's video input to get a video window on your PC's screen.

You can also use these boards to capture individual video freeze-frames as graphics. Several offer an optional tuner that lets you pick up broadcast or cable TV signals without external hardware. But they won't let you record full-motion video to your hard disk—such products still cost several thousand dollars.

WHERE TO BUY

M&M Basic, M&M Pro
Omnicomp Graphics Corp.
713/464-2990, 713/827-7540 (fax)
LIST PRICE: Basic $500, Pro $995
Reader service no. 605

Super VideoWindows-SL, Super VideoWindows-ISA
New Media Graphics Corp.
800/288-2207, 508/663-0666, 508/663-6678 (fax)
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Genoa Systems Corp.
408/432-9123, 408/434-0997 (fax)
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Reader service no. 608

Video Gala
High Res Technologies, Inc.
416/497-6493, 416/497-1636 (fax)
LIST PRICE: $595
Reader service no. 609

VMC-3 Plus
Videomail, Inc.
408/747-0223, 408/747-0225 (fax)
LIST PRICE: $495
Reader service no. 610

Q. *I've used a DOS-based statistics program for years. It seems increasingly cumbersome compared to other software I use, and the company has no plans to update it. Are there any scientific statistical programs for* Windows?

MARCO FILICORI
BOLOGNA, ITALY

A. We found five *Windows* statistical programs that may suit your needs. Fax the companies a description of the kind of analysis you do and ask if their programs can help. Also, look at *Excel 4.0*. It has many scientific and statistical functions not found in earlier versions.

WHERE TO BUY

Mathcad 3.1 for Windows
MathSoft, Inc.
800/628-4223, 617/577-1017, 617/577-8829 (fax)
LIST PRICE: $495
Reader service no. 614

Mathematica 2.1 for Windows
Wolfram Research, Inc.
800/441-6284, 217/398-0700, 217/398-0747 (fax)
LIST PRICE: $995
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WinSTAT
Kalmia Co., Inc.
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LIST PRICE: $345
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DOS 5.0's RAMDRIVE.SYS

Several readers have informed us that in our March column, we erroneously reported that RAMDRIVE.SYS cannot create RAM disks larger than 4MB. (This error in the U.S. edition of the DOS 5.0 manual was mistakenly confirmed by Microsoft when we called for advice.) After recontacting Microsoft, we learned that RAMDRIVE.SYS can create RAM disks of up to 32,767K (that's 1K short of 32MB). A second error in that manual states that the minimum size for a RAM disk is 16K; the actual minimum is 4K.

Since DOS 5.0's HIMEM.SYS can manage only the first 15MB of extended memory (that is, memory addresses from 1MB to 16MB), you'll need to use a different extended-memory manager to create RAMDRIVE.SYS RAM disks greater than 15MB. For example, *Windows 3.1*'s HIMEM.SYS (which was released after DOS 5.0's and can deal with 63MB of extended memory in most ISA-bus machines and 4095MB in EISA systems) can handle the job.

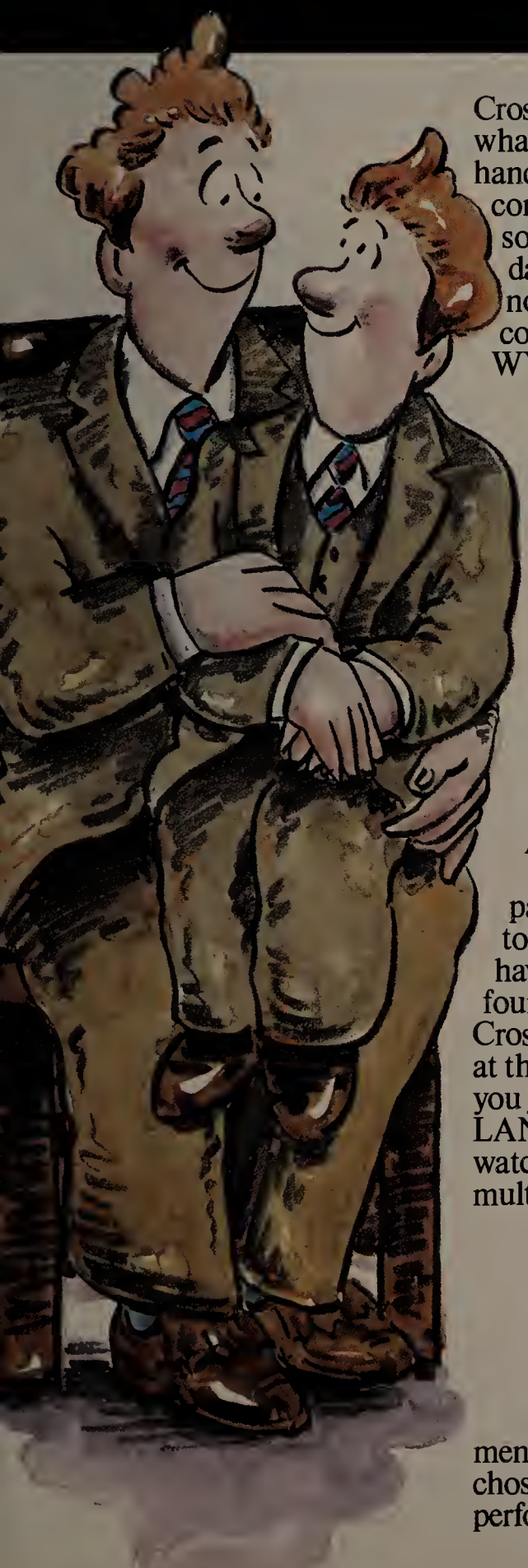
Note to Our Readers

Starting next month, *The Help Screen* will appear under its new name, *Help Line.*

Mail your questions to Help Line, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Help Line; CompuServe, 75300,3205; MCI Mail, 381-7106; Internet, rlauriston@aol.com; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

Karl Koessel is the technical editor and Robert Lauriston a contributing editor for PC World.

What Daddy Never Told You About DOS Communications.



Crosstalk® Mark 4 has always been what *Lotus* magazine called, "The hands-down Big Daddy of DOS communications," but there were some things even *this* async "big daddy" never told you. Until now, not even Crosstalk Mark 4 said you could emulate terminals like the WYSE® 50/60 or the HP® Series.* Well, the new version 2.1 says you can have these emulations and a lot more besides.

> "The hands-down Big Daddy of DOS communications packages."
> –Lotus, *October 1991*

From DEC LAT To LAN Packs, Now Big Daddy Has It All!

There's DEC LAT support, so you can connect to a VAX® via Ethernet and bypass your terminal server. There's queue dialing. An enhanced host mode. And new CASL™ commands.

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PC World Best Buy — April 1991 Crosstalk Mk. 4

PC Magazine — April 30, 1991 Crosstalk Mk.4 Version 2.0

Software Digest — Vol. 7 No. 12 1990 Crosstalk Mk.4

Reader's News Buyer's Choice

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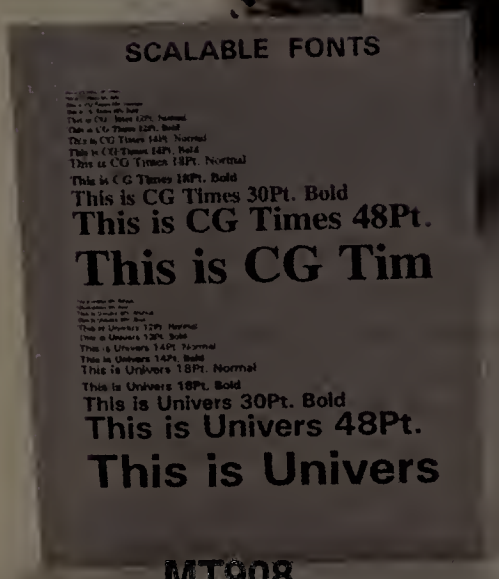
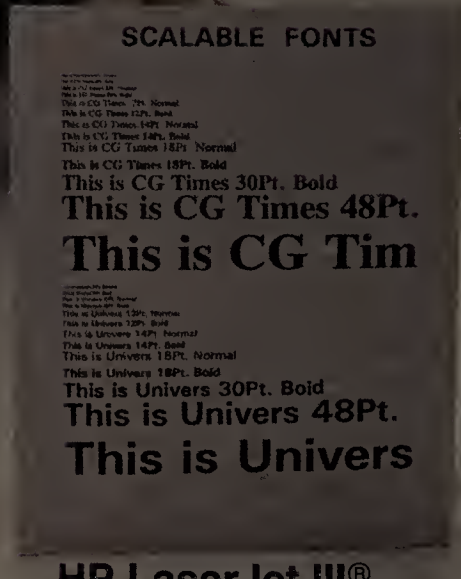


MT908



HP LaserJet III®

Okay, here's a hint. The market leading laser printer features HP® PCL5 printer control language. The MT908 laser printer from Mannesmann Tally is PCL5 compatible, as well. Oops. The market leader provides 8 scalable fonts. The MT908 gives you the same scalable fonts. Hmm. The market leader offers a feature for smoother edges on fonts and graphics. The MT908 has Edge Enhanced Technology (EET®) for the same effect.

Alright. What about performance? The market leader prints at 8 pages per minute and includes the processing power of the Motorola 68000. The MT908 prints at 8 pages per minute but provides 2.5 times faster processing of scaled fonts and graphics with its Intel i80960 RISC processor. Now we're getting somewhere.

The market leader comes with a 250 sheet capacity letter-size cassette. If you want to load legal paper, envelopes etc., you'll have to buy additional cassettes. For more convenient paper handling, the universal paper cassette of the MT908 adjusts to hold 250 sheets of letter, legal and international sizes or up to 30 envelopes. And, there is an optional 300 sheet second paper bin that mounts under the MT908 ... you can't even buy that from the market leader.

Bottom line: the Mannesmann Tally MT908 gives you all the features of the market leader with faster processing for faster throughput, better paper handling and has a list price of only $1,995... $400 less than the market leader*.

You can even add built-in PostScript language compatibility.

So any way you figure, the answer comes up the same. The MT908 looks better, and so does the price.

For the name of your nearest dealer call:

1-800-843-1347 Ext: 473

Mannesmann Tally Corporation
Kent, Washington

A mannesmann *technology company*

*Based on HP LaserJet III suggested list price of $2,395

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Circle 161 on reader service card

SPREADSHEETS (A..Z)

BY RICHARD SCOVILLE

Practical tips for building better worksheets

The more you buy, the less you pay: It's one of the time-honored lubricants that keeps the economy humming, but it can pose an obstacle to cost analysts, engineers, tax planners, and other spreadsheet builders. How do you calculate cost based on a sliding scale of prices? The same problem also comes up when figuring tax calculations or vehicle mileage reimbursements. For the purposes of this column, I've chosen *1-2-3* to illustrate the solution, but you can reproduce the procedure with any spreadsheet program.

How Do You Rate?

Many commodity-goods vendors offer volume discounts. Take natural gas, for example. Commercial customers might pay 30 cents per therm for the first 1500 therms consumed in a month, 29.5 cents for each additional therm up to 4500, 28.5 cents up to 9000, and 25 cents for therms over 9000. (A *therm* is a measure of the heat content of gas, roughly equivalent to 100 cubic feet.) At first glance, you might be tempted to try @IF functions to calculate your company's gas bill. But when you're dealing with three or more price levels, you should use a rate table like the one shown in B3..D6 of **FIGURE 1.**

The threshold amount for each rate level is shown in column B of the table, with the corresponding rate in column C. Column D contains the base cost (that is, the cost for the quantity shown in the same row of column B). Suppose you consumed 2000 therms last month. Since you used more than 1500 therms, but less than 4500, you refer to the second row of the table: You'll pay 30 cents per therm for the first 1500 therms, or $450, the base amount shown in cell D4. Then you'll pay 29.5 cents per therm for the remaining 500 therms over the threshold, or $147.50, for a total cost of $597.50.

Here's how to set up the table: Begin by entering the labels shown in B2..D2 and A9..A19, and the values in B3..C6 and B9. In D3, enter **0**, the base amount for the first rate level. In cell D4, enter the following formula to calculate the base amount for the second level: **(B4-B3)*C3+D3**. This formula starts with the number of therms in the previous rate level (B4-B3), multiplies that number by the previous rate (C3) to calculate their cost, then adds that amount to the base value for the previous level (D3). Copy this formula into D5..D6 to get the base amounts for the remaining rate levels.

	A	B	C	D
1				
2		Threshold	Rate	Base
3		0	0.300	0.00
4		1500	0.295	450.00
5		4500	0.285	1335.00
6		9000	0.250	2617.50
7				
8				
9	Amount used	2000		
10				
11	Base	450.00		
12				
13	Threshold	1500.00		
14				
15	Cost of excess	147.50		
16				
17	Cost	597.50		
18				
19	All in 1 cell	597.50		

FIGURE 1: A worksheet that calculates volume discounts for goods purchased, or even mileage reimbursements, can save hours of mind-bending calculations.

ANTHONY RUSSO

Looking Up the Cost

Now build a formula that will compute the cost for a period. To do this, the formula needs to look up the threshold, base cost amount, and incremental rate for a given level of consumption. Enter the number of therms used in the month in cell B9. We'll create the formula in stages, then combine the pieces into one comprehensive formula.

B11: **@VLOOKUP(B9,B3..D6,2)** This VLOOKUP function fetches the base amount from the table. It compares the value in B9 with the entries in the first column of the table at B3..D6. (These entries are arranged in ascending order as required by VLOOKUP.) The function starts at the top of the specified range and moves down the column, comparing each cell's value with that of cell

➔

Excel Shortcut

GENERATING FORM LETTERS

by Ralph Soucie

If you maintain a data base of customers or contacts in *Excel*, sooner or later you'll want to use that data to generate form letters. With most *Windows*-based word processing programs, creating a data document from *Excel* data is fairly simple.

Let's suppose you've created a form letter using *Word for Windows* and want to use the address data base to create the *WinWord* data document. Start by removing all spaces from the header row in the *Excel* worksheet. *Word for Windows* won't merge the data into the form letter if the header record in the data document contains spaces.

Use the *Windows* Clipboard to copy the *Excel* range containing the name and address data into a blank *Word for Windows* document. (In *Excel*, choose *Edit•Copy*. Then switch to *Word for Windows* and choose *Edit•Paste*.)

Word pastes the data in as a table. Save the *WinWord* document, then follow the normal *Word for Windows* procedure to attach it to your form letter as a data file.

If you find erroneous data, you can correct the data document from within the word processor and copy the corrections into the *Excel* worksheet.

B9. It stops when it finds the highest value that is less than the value of cell B9—that's 1500, in cell B4—and returns the corresponding cost amount (450) from column 2 of the table. (In *1-2-3* and *Quattro*, the leftmost table column is counted as zero; in *Excel*, it's column 1, so the equivalent formula would read **@VLOOKUP(B9,B3..D6,3)**.)

B13: **@VLOOKUP(B9,B3..D6,0)** Since the VLOOKUP function matches the next lowest item in the leftmost column, and since in *1-2-3* that column is zero, this LOOKUP function returns the rate level threshold value from cell B4.

B15: **(B9-B13)*@VLOOKUP(B9,B3..D6,1)** This formula calculates the cost of the therms that exceed the rate level threshold. It subtracts the threshold value (calculated by the formula described in B13) from the therms consumed (cell B9), then multiplies that number by the price per therm, which it can find by looking it up in column 1.

B19: **@VLOOKUP(B9,B3..D6,2)+((B9-@VLOOKUP(B9,B3..D6,0))*@VLOOKUP(B9,B3..D6,1))** This comprehensive formula uses the lookup function in order to compute, finally, the total cost of the number of therms in cell B9.

In *Excel*, the right formula would be **=VLOOKUP(B9,B3:D6,3)+((B9-VLOOKUP(B9,B3:D6,1))*VLOOKUP(B9,B3:D6,2))**. Use this type of formula when you have to compute the cost of a commodity that's priced on a sliding scale based on volume.

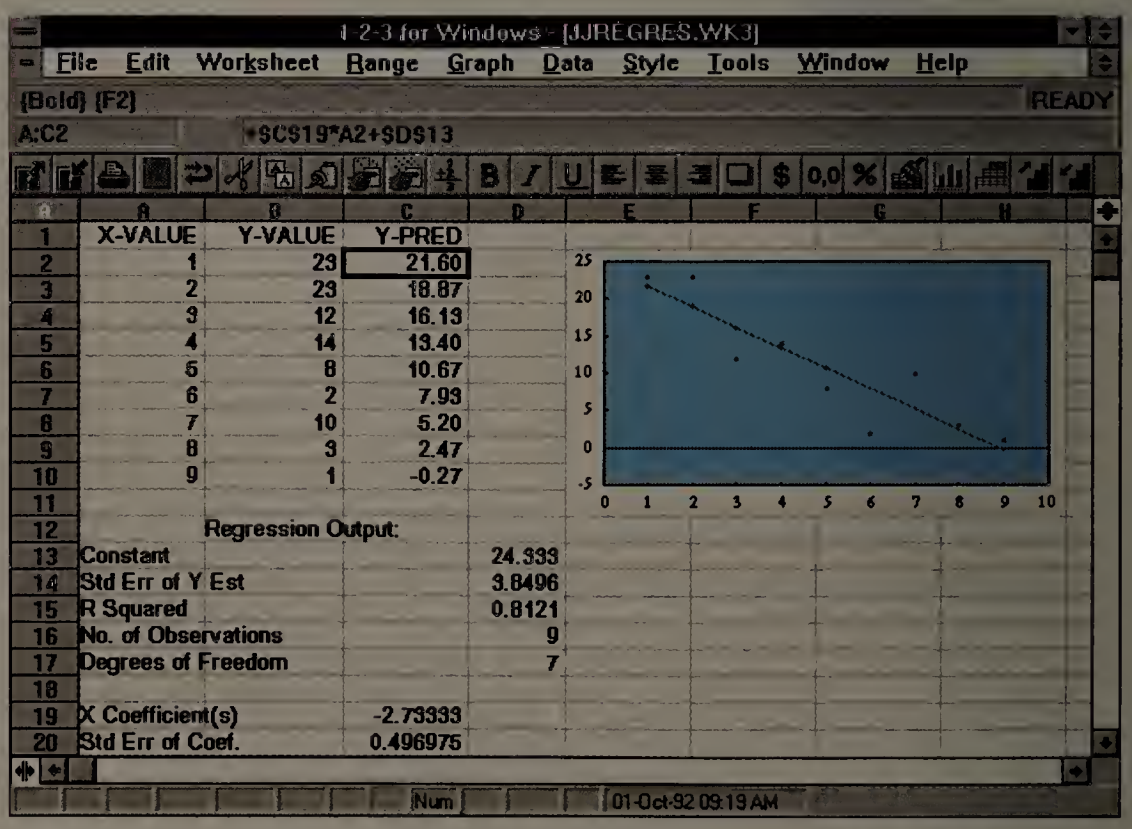
Questionable Spreadsheets Department

Q. *I use the regression function in* 1-2-3 for Windows. *It's easy to use, but I miss the option of plotting the regression line. Is there a way to come up with an* x-y *graph that shows the data points and the line?*

MARKUS DUBACH
ST. PAUL

A. Unlike some programs (*Harvard Graphics*, for instance), *1-2-3* makes you build your own regression line. Fortunately, *1-2-3*'s regression output gives you everything you need for the task. To build the example shown in **SCREEN 1**, enter the dummy data values that appear in A2..B10. Then select *Data•Regression*, specify A2..A10 as the X-Range, B2..B10 as the Y-Range, A12 as the Output range, and click *OK*. *1-2-3* provides the results shown in A13..D17.

Now, recall that the formula for a



SCREEN 1: 1-2-3 for Windows can build an x-y graph that plots a regression line.

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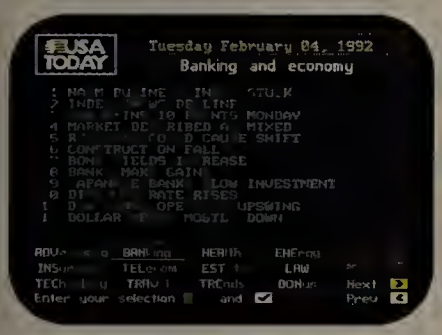

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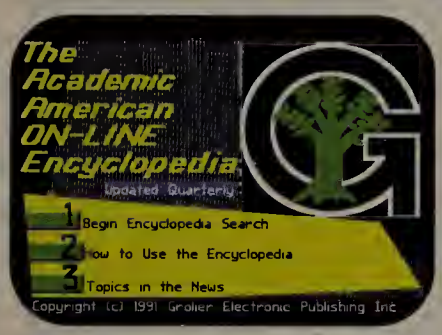

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Spreadsheet Toolbox

BUILDING IN UNCERTAINTY

Modeling—playing the what-if game—is the raison d'être of electronic spreadsheets. But your models are only as accurate as the assumptions you build into them. In projecting your firm's future cash flow, for instance, you would normally assume certain values for future rates of interest and inflation, along with market demand and many other factors. But in a fast-paced, turbulent world, wouldn't it make more sense to build provisions for uncertainty into your spreadsheet model rather than make assumptions?

That's the idea behind *@Risk*, a $395 add-in for *1-2-3* and *Excel* from Palisade Corporation. *@Risk* provides a host of probability distribution functions for stating your model's assumptions. Instead of projecting sales of 3500 units, for instance, you would specify unit sales to be normally distributed with a mean of 3500 and a standard deviation of 200. Once you define your assumptions as probabilities, *@Risk* runs a simulation: It generates repeated sets of sample values based on your assumptions, calculates the outcome, and stores those results. Finally, it graphs the probability distribution of the computed results. You might discover that while your best guess is a $500,000 positive cash flow in December, there's a 5 percent chance it will be negative and a 10 percent chance it will be over $600,000.

@Risk is not for the statistically fainthearted, but in an uncertain world, it's a useful fuzzy-logic tool for strategic planners, investment analysts, and forecasters in such fields as epidemiology and engineering.

@Risk $395; Palisade Corp., 31 Decker Rd., Newfield, NY 14867; 607/277-8000.
Reader service no. 691

straight regression line is $Yp=mX+b$, where Yp is the predicted value of Y based on X, m is the slope of the line, and b is the value of Y when X is zero. In the regression output, the 'Constant' in D13 is b, and 'X Coefficient' in C19 is m. Use these values to build the formula in C2 for the predicted value of Y for the first X value: +$C$19*A2+$D$13. Then copy it into C3..C10.

Finally, set up the graph: Select the range A2..C10, click the graph tool in the tool bar, and a line graph appears. Select *Chart•Type*, choose *XY*, and click *OK*. Then choose *Chart•Options•Lines*, deselect *Connector* for the *A* range, deselect *Symbols* for the *B* range, and click *OK*. The result is the graph shown in the figure.

Q. *In* Excel 3.0, *the cursor moves down automatically when I press <Enter> after making a cell entry. How can I stop this?*

AKIRA WATANABE
TOKYO

A. Just select *Options•Workspace* and deselect the option *Move Selection after Enter.*

Q. *As secretary for my bowling league, I use* 1-2-3 *to do my weekly score sheets. In the spreadsheet, I have the players listed individually by first and last name, for example,* John Doe. *How do I sort the list by last name, in the format* Doe, John*?*

RON GOETZ
FREEPORT, ILLINOIS

A. First, you must delete any middle initials and extra spaces; the following method works only with first and last names separated by a single space.

Let's assume that you have the names in column A. Go to B1 and use the command */Worksheet•Insert•Column* to insert a working column. Enter this formula: **@RIGHT(A1,@LENGTH(A1)- @FIND(" ",A1,0)-1)&",&@LEFT(A1,@FIND(" ",A1,0))**.

The @LENGTH function gives the number of characters in the name; the @FIND function gives you the position of the blank between the first and last names (the first letter is in position 0, the second in position 1, and so on); the difference between @LENGTH and @FIND minus 1 is the number of characters in the last name.

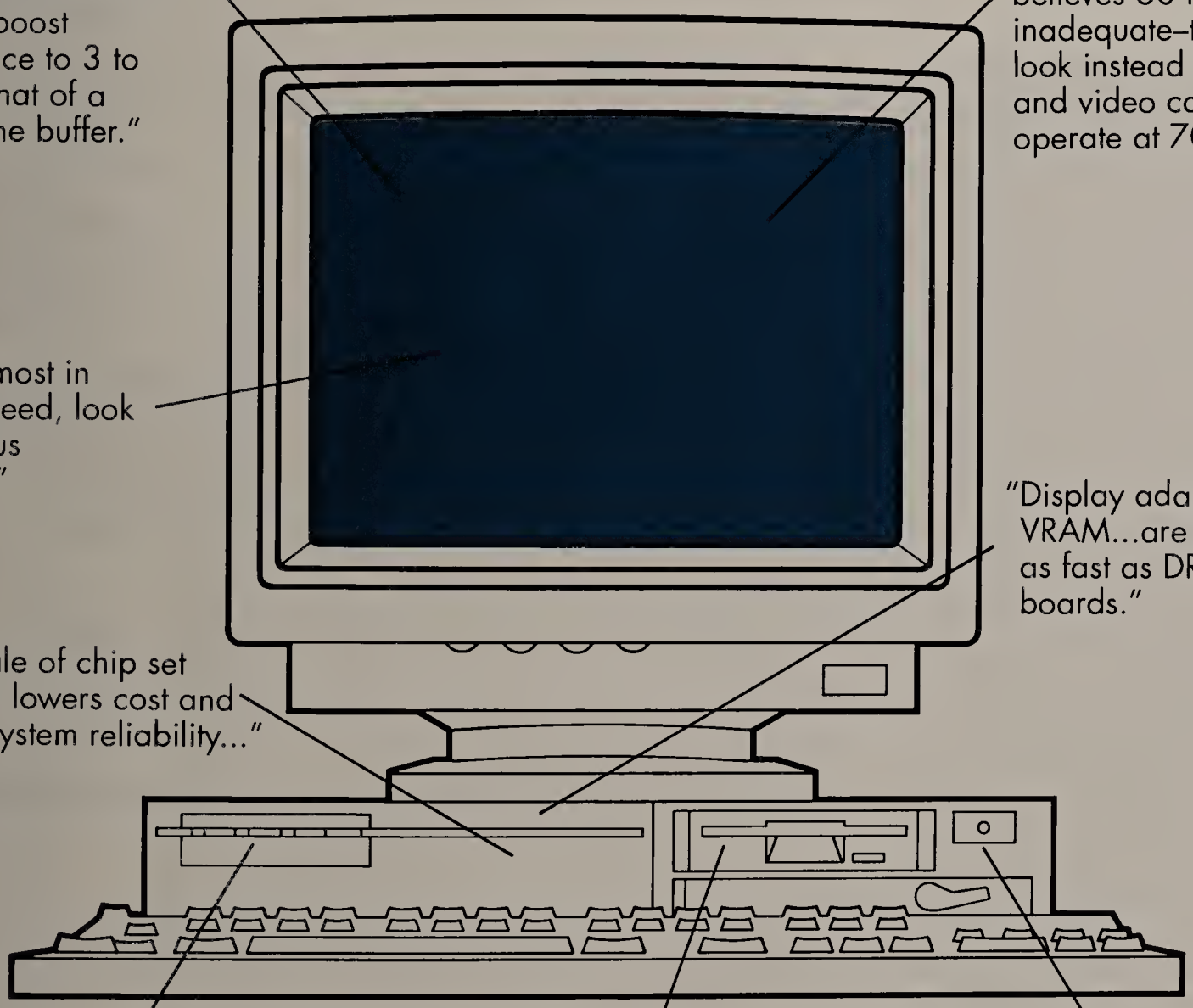
The @RIGHT function takes that number of characters from the end of A1, that is, the last name. The &", " pastes in a comma and a space, and &@LEFT(A1,@FIND(" ",A1,0)) adds the first name, taken from the beginning of the string.

Next, copy that formula down column B to calculate all the names in the new format. Then select */Range Value*, highlight all of the formulas, and press **<Enter>** twice to replace the formulas with string values. Now you are ready to sort using the second column as the Primary-Key and print.

Mail your spreadsheet questions to Spreadsheets (A..Z), PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Spreadsheets (A..Z); CompuServe, 72341,2727; MCI Mail, 357-4517; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

Richard Scoville and Ralph Soucie are contributing editors for PC World.

JULY 1992, PC MAGAZINE DESCRIBES THE PERFECT PERSONAL COMPUTER.



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or the utmost in
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local bus
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egration lowers cost and
proves system reliability..."

save space, look for built-in
rallel and serial ports, and
E and video circuitry."

"At 1,024-by-768 resolution, PC magazine believes 60 Hz is inadequate–too flickery–... look instead for monitors and video cards that operate at 70 or 72 Hz."

"Display adapters using VRAM...are often twice as fast as DRAM-based boards."

"To take advantage of a 32-bit operating system such as OS/2 2.0 or Windows NT (when it ships), you will want at least 8 MB of RAM, so a 16 MB motherboard may prove limiting in the next couple of years."

"Note that metal SIMM sockets are preferable to plastic ones."

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When *PC Magazine* dreamed of the perfect PC, did they guess Digital was busy building it?

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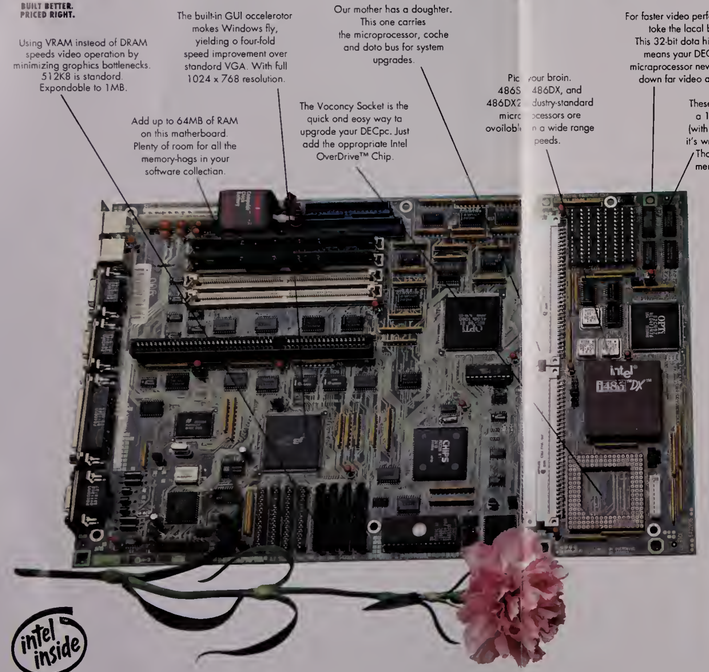

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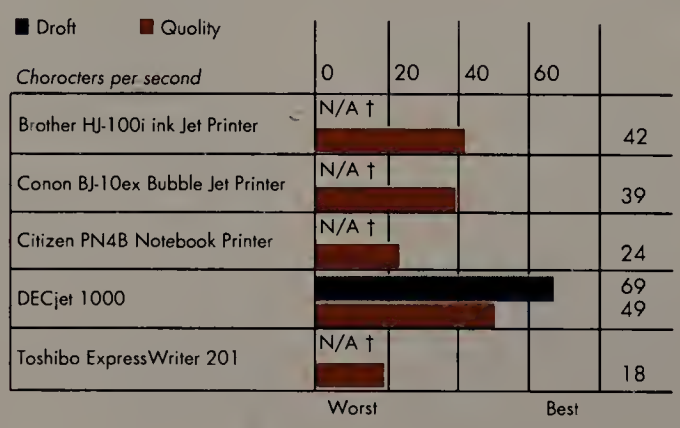
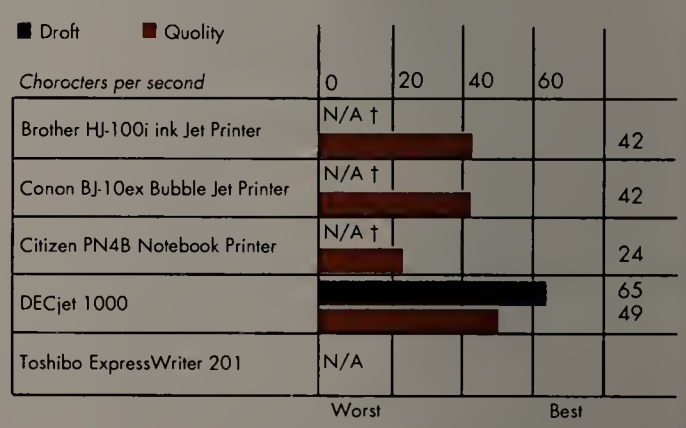


IBM Emulation



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WORD PROCESSING CLINIC

BY GEORGE CAMPBELL

Tips for getting the most out of your word processor

Q. *I'm having trouble figuring out how to record keystroke macros in* WordPerfect 5.1. *Can you clarify?*

ALAN BAUMBERGER
CLEVELAND

A. I'd be glad to. *WordPerfect* lets you record keystrokes and assign them to an <Alt>-*key* combination, cutting common operations down to a single keystroke. Here's how to create a sample macro for *WordPerfect 5.*x that moves the cursor to the top of your document when you press <Alt>-T:

1. Press **<Ctrl>-<F10>** to start recording. You'll see a 'Define Macro' prompt.

2. Press **<Alt>-T** or another <Alt>-*key* combination. If the combination is already in use, *WordPerfect* asks if you want to replace it, or you can press <Enter> to abort the recording.

3. Next type a description for your macro and press **<Enter>**. (If you don't need to have a description, just press <Enter>.)

4. Now press **<Home><Home><Up>**, the keystrokes that send the cursor to the top of the document. You can substitute other *WordPerfect* commands, text, or a combination of both.

5. When you're finished, press **<Ctrl>-<F10>** again to stop recording and save the macro.

From now on, whenever you're in *WordPerfect* your shortcut key will repeat all the keystrokes and commands you gave in step 4.

Q. *When I create ellipses (. . .) in a justified* WordPerfect 5.1 *document, I like to insert a space between the periods; I think it looks better. But when I print,* WordPerfect *messes up my spacing so the ellipses look different depending on how the line is justified. How can I even things up?*

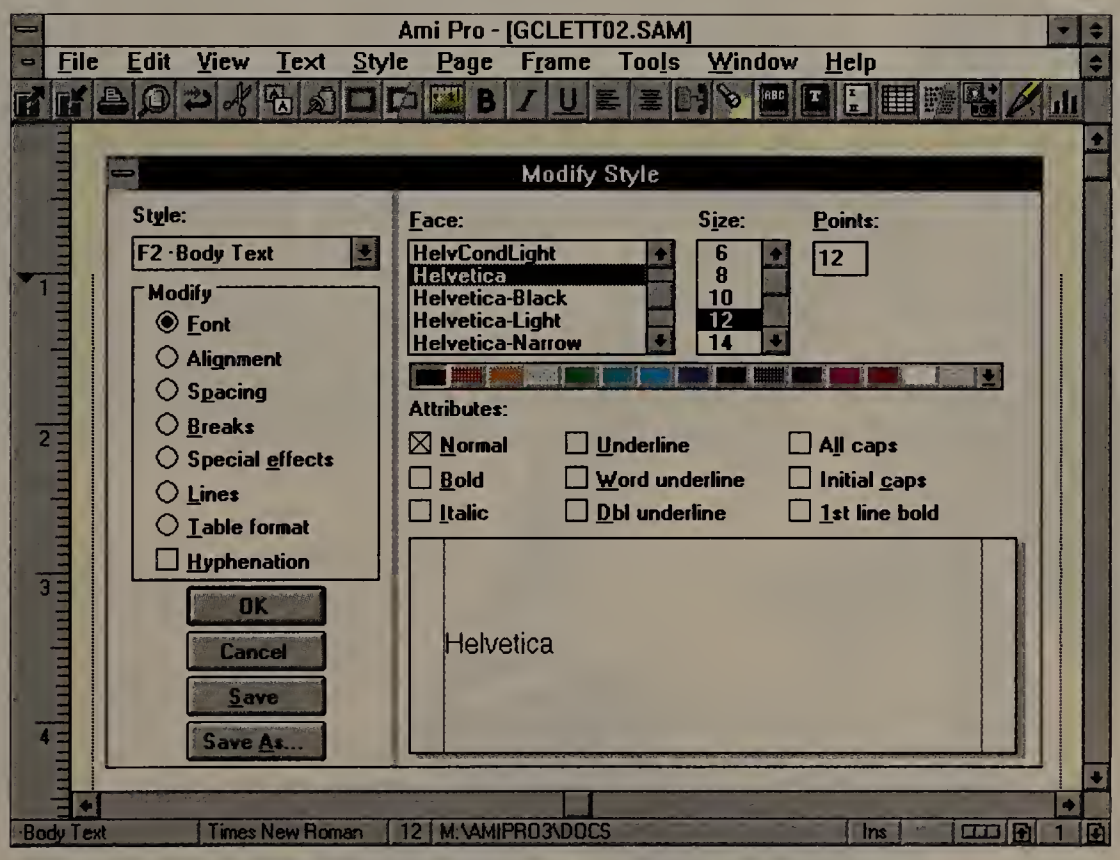
SIDNEY FLEISCHER
BOISE, IDAHO

A. Typographers might cringe at your spaced-out ellipses, but if that's the way you like to see them, there's a way to do it. *WordPerfect* (and most other programs) justify text by varying the width of spaces in between words and letters. If you want those spaces to be uniform, you can use *WordPerfect*'s *hard spaces.* Instead of pressing the Spacebar between the periods, press **<Home>-<Space>**. This tells *WordPerfect* not to alter the width between these spaces when justifying. Hard spaces also come in handy if you want to use proper names, such as a company name, or to get rid of white lines that sometimes run vertically through a paragraph.

Other programs have similar tools. To insert a hard space in *WordPerfect for Windows, Ami Pro,* and most other *Windows* word processors, you press **<Ctrl>-<Space>**. For a hard space in *Word 5.*x and *Word for Windows,* press **<Ctrl>-<Shift>-<Space>**.

Q. *I use* Ami Pro 2.0, *but I'm running into a problem with fonts. Sometimes when I select a new font or change font size, it works okay. At other times, though, the text I type is in the program's default font. What's wrong?*

DAVE PARSONS
SANDY CREEK, NEW YORK



To change Ami Pro's default font, select Style•Modify Style to bring up this dialog box, and change the Body Text font. You can change the default font in all other Windows word processor using similar techniques.

ANTHONY RUSSO

A. This can be annoying, but it's not a bug. If you choose a font and type text immediately, you'll see that font. If you move the cursor to another location, even to the next character, you get the default font instead. You can avoid the problem in two ways.

First, remember that a new font applies only to characters inserted at the cursor or in the text already using that font. So if you're seeing the wrong font, back the cursor up until the correct font name shows on the status line at the bottom of the window. If you want to carry the font over into a new paragraph, press <Enter> for a regular paragraph return while the font you want is still displayed on the status line.

If you want to apply a new font to the entire document, it's better to modify the style sheet. In *Ami Pro,* choose *Style • Modify Style,* then select a new font and size for the *Body Text* style—the default style for normal text—from the lists in the dialog box. After making your changes, click *OK* to make that font the default for the current document.

Q. *We use* Microsoft Word *on both DOS and Macintosh platforms in our office. While* Word for Windows *handles text conversions between the Mac and PC versions very well, our documents also include scores of Macintosh graphics.* Word for Windows *can import these PICT and PNT files, but only one at a time, and slowly at that. As you can imagine, this complicates our task. Do you know of a solution?*

DOUG KERSH
KENT, WASHINGTON

A. There *is* a solution, and it's quite easy. The problem is, you're converting the Mac's *Word 5.0* documents inside *Word for Windows 2.0.* If you do the conversion on the Mac instead, your graphics won't need any further work. Here's how: After creating the document (including all your graphics) on the Mac, select *File • Save As.* Type in a file name, then click the arrow on the Save File as Type list box. Select the *Word for Windows 2.0* option, then click *Save.*

You'll need to copy the file to an IBM-compatible disk on the Mac. When you open the preconverted file in *Word for Windows,* your graphics will be in place. One caution: You may have to break large documents down into smaller chunks to fit them on the transfer disk.

Mail your word processing questions to Word Processing Clinic, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Word Processing Clinic; George Campbell, CompuServe 71571,222; MCI Mail, GCAMPBELL; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

George Campbell is a contributing editor for PC World.

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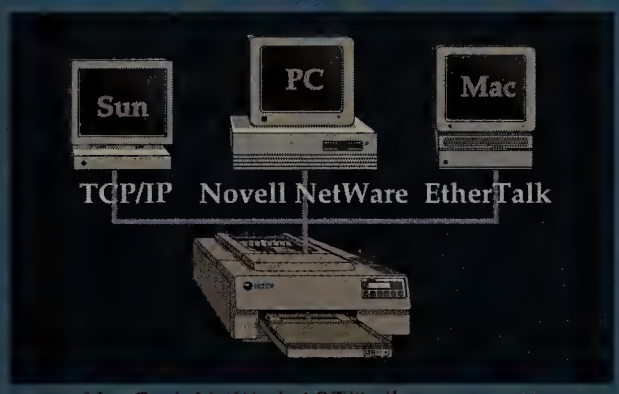

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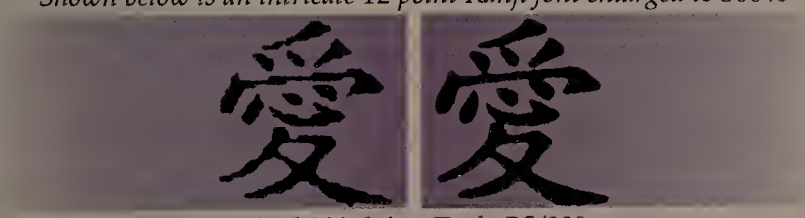

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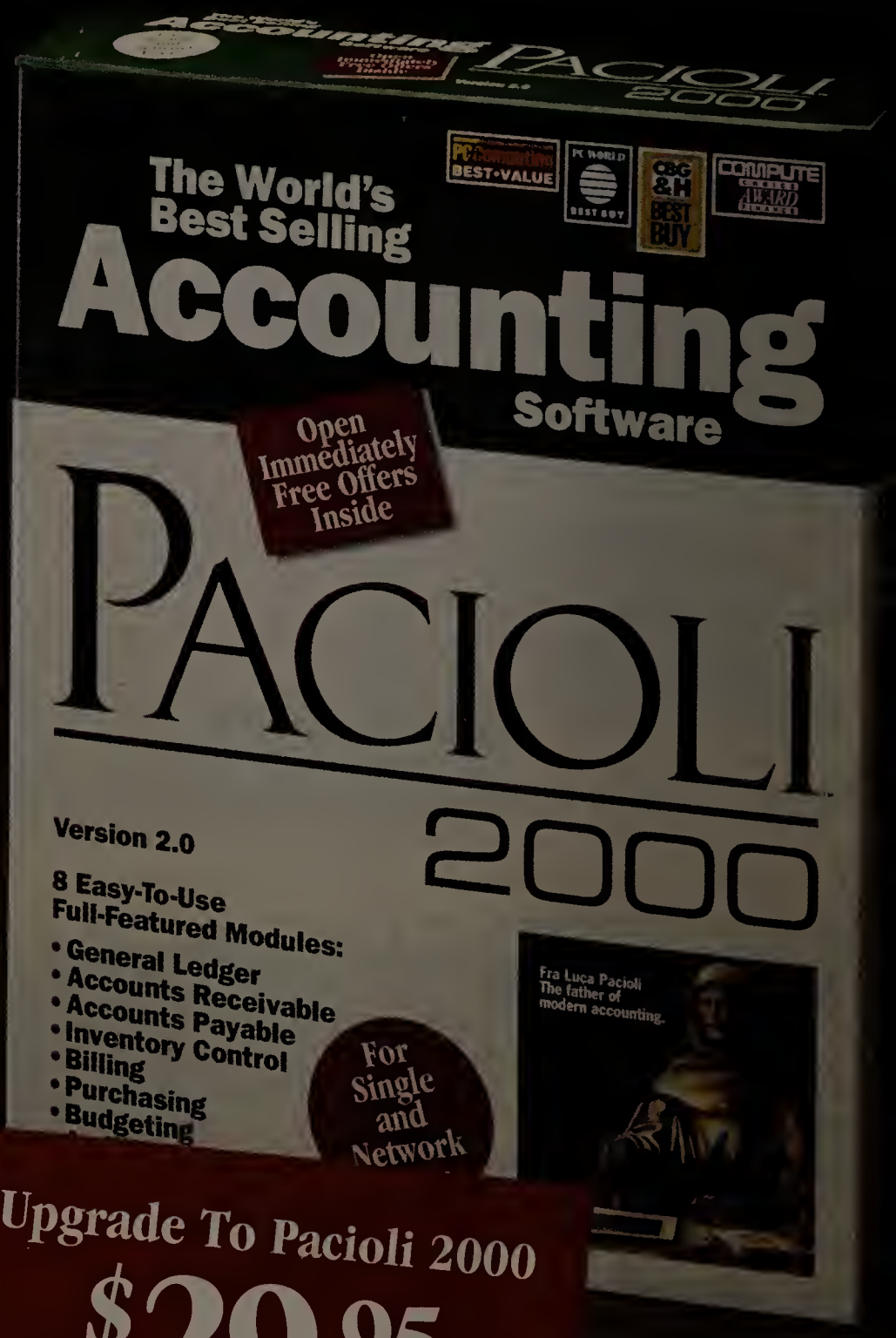

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FEBRUARY 17, 1992

Gateway To Fix Glitch In Its 486 Motherboard

Users Complain of System Lockups

Gateway 2000 is offering to replace the motherboard in certain 486 systems that users said can lock up or report incorrect results when running applications compiled using FORTRAN compilers.

The problem, as reported by several Gateway customers on CompuServe, occurs when the 33MHz 486-based systems run programs that calculate numbers too large or too small for the machine to handle.

...on his Gateway 2000 486/33 when the system took the result of its calculations, which was a very small decimal between zero and one, incorrectly changed the result to 10 and kept doing calculations.

He said the problem only happens the first time a program is run after the machine is rebooted.

Gateway's Schmith said the firm has only had reports of systems locking up, not generating inaccurate results

See GATEWAY Page 32

"You've got a 'Gateway excellent deal'...but a product that doesn't work." said Jason Glassberg, vice president of systems and planning for J&W Seligman & Co., a brokerage in New York.

–PC Week, May 25, 1992

A4 THE WALL STREET JOURNAL MONDAY, MAY 11, 1992

... But after two weeks of use, all three started smoking and locked up. "You get this burning smell," he says. Gateway fixes such problems for free during the first year, in this case by swapping out the defective circuit boards at the manufacturer's expense.

A technical evaluation team from Amoco Corp., after a visit to Gateway's new headquarters in an industrial park, issued a blistering internal report contending the manufacturer showed a "lack of adherence to prudent quality practices." One inspector urged anyone planning to buy a Gateway to visit the factory first; "I expect they will change their mind." ...

Gateway Motherboard Fix Offered

Continued from Page 29

The lockup glitch, he said, is caused by a timing problem that causes the math coprocessor in the 486 CPU to stop functioning before it has finished its calculations.

Micronics Computers Inc., which supplied the motherboards to Gateway, has made a "minor fix" that eliminates the problem, said Edward Ying, Micronics' product marketing manager in Fremont, Calif. Micronics has supplied Gateway with the new motherboards, he added.

Schmith said the problem only occurs on Industry Standard Architecture (ISA) versions of the 33MHz 486 Gemini motherboard. He added, however, that Gateway is not sure how many systems were released with the faulty motherboards.

Gateway, which has received approximately 50 complaints about the problem, will replace the motherboards free of charge, he said. The company can be reached at (800) 523-2000. ■

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- TOUCHE received the best PC Product 1992 award in *PC Computing* 6/92 issue.
- In Sweden, TOUCHE recently beat AST, DELL, COMPAQ and 6 others to win the highly coveted "GULD BITEN" (Gold Bit) award for superior performance and design!
- Computers Buyers Guide awarded TOUCHE 486-33 its BEST BUY award, stating it was "one of the fastest computers ever tested" after comparing TOUCHE, Northgate, Gateway 2000 and 6 others!
- In May 1992 Computer Shopper compared 8 486 EISA systems including ZEOS and Gateway 2000. TOUCHE "had the best price/performance ratio!"

All of our systems are FCC B level certified, further proof of the quality these U.S. made custom-built systems display. FCC is beginning a major crackdown of cheap systems without genuine FCC emissions compliance. Most cheap systems won't meet FCC requirements. Current FCC plans include visiting user sites and testing for compliance. FCC has the power to stop you from using systems not in compliance! **WHY TAKE CHANCES?**

Our famous WYSIWYG policy is further proof of our commitment that you'll get exactly what you order from us. No hidden surprises, used or returned parts, or chintzy, inferior, no-name components that many of our competitors use to cut corners and stick extra dollars in their pockets. Ask every company to specify the manufacturer and exact model of every component used to build their system, then have them guarantee that's exactly what you'll receive. As an example, ask them if they even know the name of their power supply. If it isn't PC Power & Cooling then it isn't the best! Do you really want to pay your hard-earned money for some cheap $15 power supply named *MIGHTY RED DRAGON* that can create total chaos in your $4,000 computer? **WHY TAKE CHANCES?**

We offer a two-year warranty! Ask the other companies when you call them why their warranties are only one year. Ask them how many $1000's they will charge to replace their motherboard and monitor when they fail after only 12 months of use. Then have them put that in writing for later use. **Chances are you're going to need it! WHY TAKE CHANCES?**

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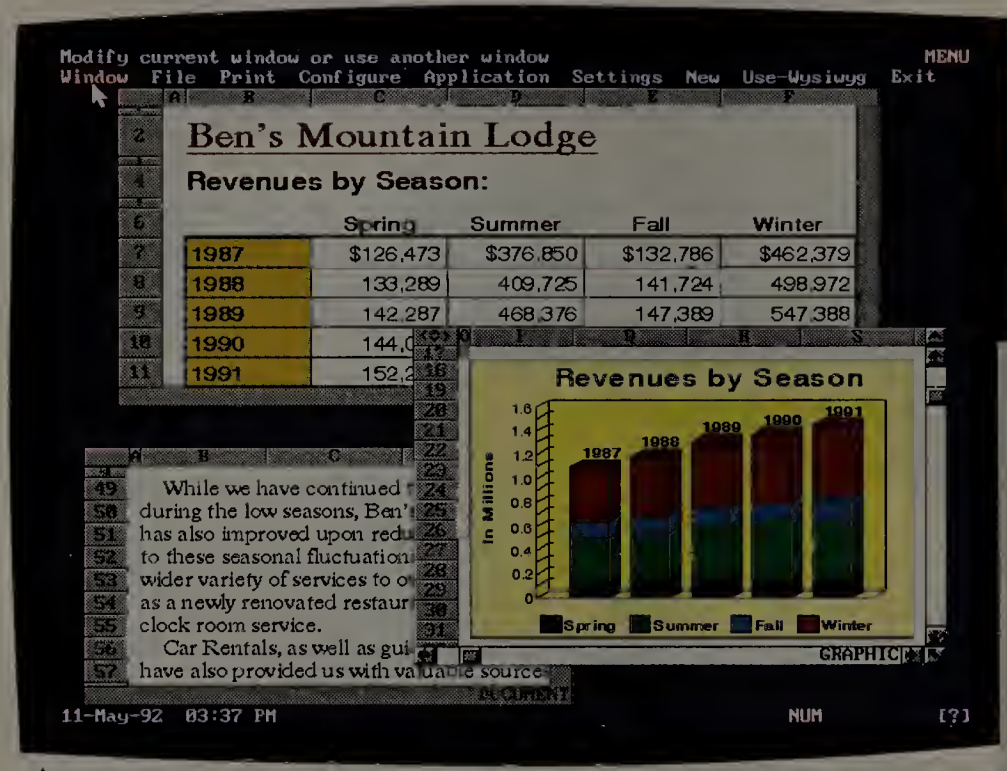
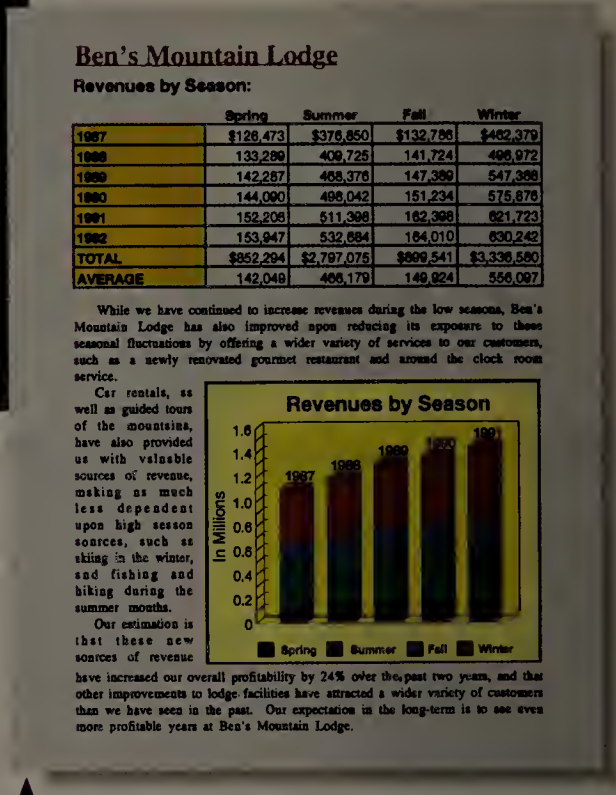
Unlike most symphonies, this one needs to be seen to be appreciated.



With our new WYSIWYG interface, you can easily create graphs, draw lines and add arrows, shading and color to your letters and reports.

Symphony windows let you perform different tasks side by side on screen in a DOS environment. Just choose the size and number of windows you want to display.

Now Symphony comes with full mouse support, so clicking from window to window is a breeze.



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Lotus Symphony

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DATA BASICS

BY CELESTE ROBINSON

Tips and techniques for managing your data

Q. *We keep our list of products in a* dBASE III Plus *data base. I want to selectively update the prices of various items. What's the easiest way to do this?*

JAMES HOLLY
NEW YORK

A. Whether you're working with *dBASE III Plus, dBASE IV, FoxPro,* or another "Xbase" clone, you can use the REPLACE command to change values in a group of matching records. For example, let's say you want to add 8 percent to the prices on all of your "Frame" products. Assuming the correct data file is in use and that your price and product type information are in fields called Price and Prod_Type, the command **REPLACE FOR Prod_Type = "Frame" Price WITH Price * 1.08** will raise the prices.

Q. *I keep fund-raising records in* Paradox, *and I periodically send form letters to people who last donated during a certain period. To automate the job of printing just the records I need, I recorded a script that queries my donor table, then prints the letters (in the form of a report) from the answer table. The problem is that before I use the script, I always have to change the dates it uses to select records. Is there a way that I can simplify this without programming?*

ANDREA BALISTRIERI
SAN CARLOS, CALIFORNIA

A. The answer is no, you can't do this without programming. The good news is that I've done the programming for you.

You can create the script in **LISTING 1** with any text editor; to use the one that comes with *Paradox,* simply select *Scripts • Editor • Write* from the main menu. My script assumes that the table you need to query from is called Donor and that the form letter is set up as the default R report. To make this work with your table, change the word Donor in lines 20 and 23 to your own table name, and the first "R" in line 23 to your report number (keep the second "R," at the end of the line, as "R").

When you need to print your letters, press **<Alt>-<F10>**, select *Play,* and type the name of your script.

Q. *I've heard that when editing or entering* R:BASE *data, all you need to do is press <Shift>-<F3> for a pop-up menu of the current field's possible choices. I've tried this while editing a table and it doesn't work. Also, how do you tell* R:BASE *which values to display in the pop-up menu?*

DANIEL ROSENTHAL
CHICAGO

A. The *R:BASE* pop-up feature, which lets you pick from a list of existing values for the current field, is available only when you're working with data in a form; you can't use it while directly editing a table. When you press **<Shift>-<F3>** in a form, *R:BASE* asks for a WHERE clause to limit the list's values; press **<Enter>** if you don't want any limits. The program then lists every entry for that field currently in the table, from which you can select the one you want.

If you haven't created a form for your

```
CLEAR
CLEARALL
startdate = BLANKDATE()
enddate = BLANKDATE()
@ 5,5
?? "Please enter a starting date: "
ACCEPT "D" TO startdate
IF NOT retval
 THEN RETURN
ENDIF
@ 7,5
?? "Please enter an ending date: "
ACCEPT "D" TO enddate
IF NOT retval
 THEN RETURN
ENDIF
CLEAR
@ 22,20
?? "Preparing to print letters..."
MENU {Ask} {Donor} CHECK
MOVETO [Date] ">=~startdate,<=~enddate" DO_IT!
IF NOT ISEMPTY("Answer")
 THEN COPYREPORT "Donor" "R" "Answer" "R"
 INSTANTREPORT
ENDIF
```

LISTING 1: This Paradox PAL script asks you which records, by date, to print.

ANTHONY RUSSO

table, now is a good time to start. With your data base loaded, choose *Forms • Create/modify • Create • Quick form.* Enter a form name and description, and choose your table from the resulting list and follow the prompts.

To use the form and pop-up feature, go to the main menu, choose *Forms,* and select the form you just created. While using this form, press **<Shift>-<F3>** on any field to see a pop-up menu containing all values already in that field.

Mail your questions to Data Basics, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Data Basics; CompuServe, 74055,412; MCI Mail, 179-3813; 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

Celeste Robinson is a contributing editor for PC World.

Reader Tip

ANOTHER DELETED INDEX SOLUTION

In the June 1992 *Data Basics,* D. J. Longhini asked how records that are marked for deletion could be tracked for reuse in *dBASE III Plus.* You suggested indexing the file on the condition IIF(DELETED(),0,1) and commented that this will work in dBASE-compatible programs as well.

If you're using *dBASE IV* or *FoxPro 2.0,* you can create an index that contains nothing but "deleted" records. This technique makes certain you won't write over an undeleted record, and you can sort the index on any field or expression you want.

The command to create the index is **INDEX ON** *expression* **FOR DELETED() TAG IsDelete**, where *expression* is the field name or expression you want the data sorted on (Inv_No, LastName+FirstName, or whatever). Once the index is created, a simple **SET ORDER TO IsDelete** will effectively filter out all undeleted records. To keep deleted records out of the way when you don't want them, create all your other indexes with a **FOR NOT DELETED** parameter.

PETE KRUCKENBERG
SALT LAKE CITY

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–Richard Link, Administrative Assistant

"This was a big investment. I'm still waiting for the big return."

–Peggy Turner, CFO

"I thought you said these were going to increase productivity."

–Greg Collins, Office Manager

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During the 1980s, personal computer use increased by over 5000%. Even so, some industries saw productivity increase by as little as one percent.

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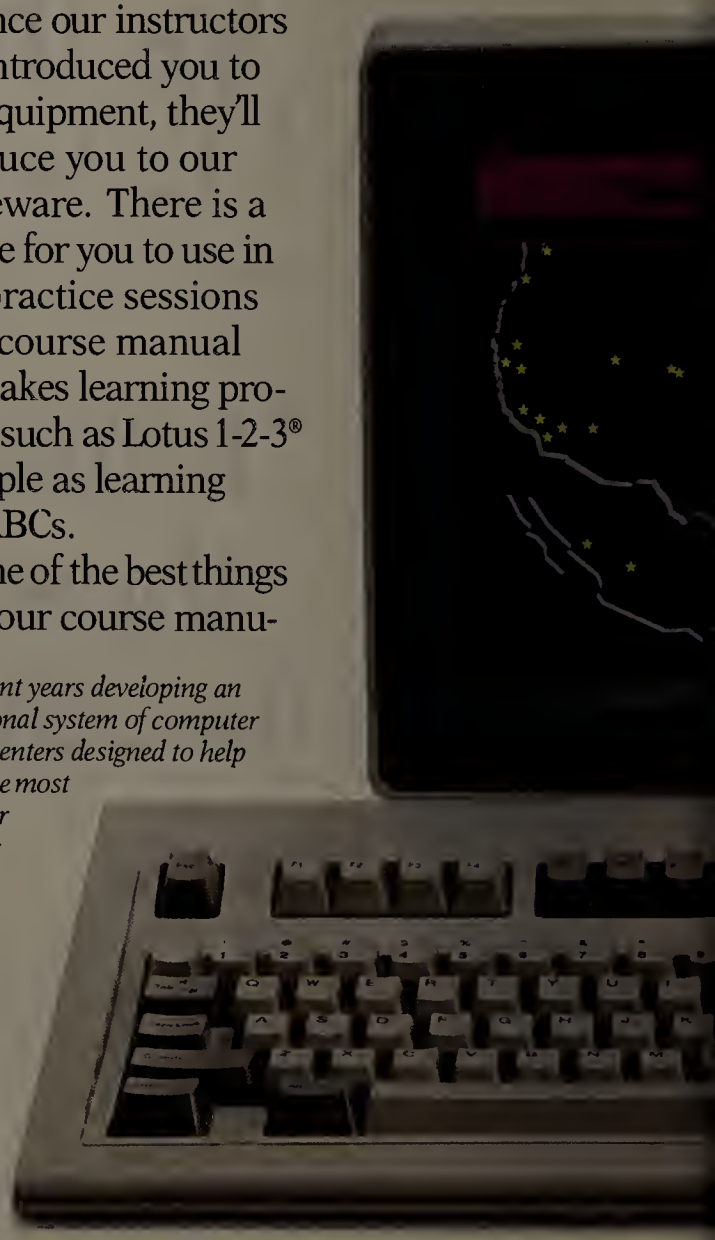

nputer training popular complaint.

Our instructors are hired based on how well they communicate. You can count on being taught by an expert with a gift for clear, patient instruction.

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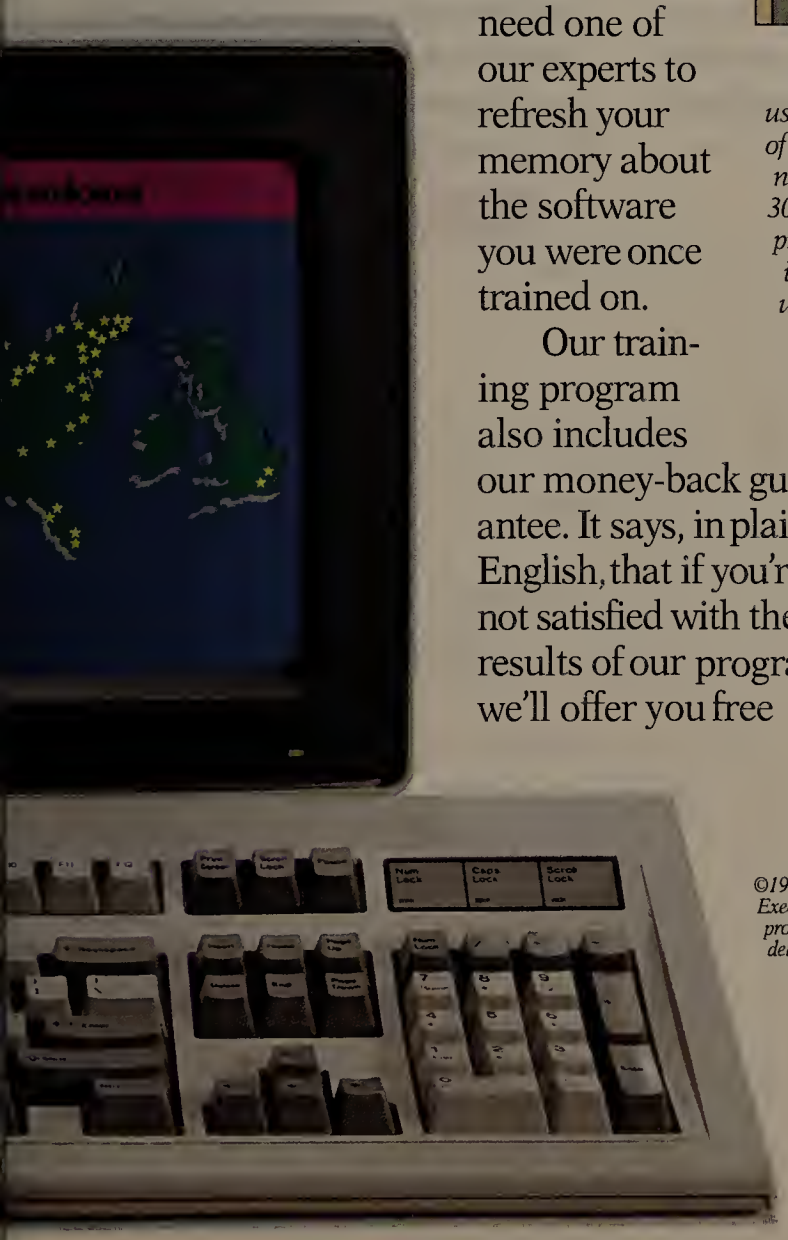

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PUBLISHING & PRESENTATIONS

BY RICHARD JANTZ

Expert advice for creating high-impact documents and presentations

That technical report, proposal, or presentation you've worked so hard on may contain vital information, but if it looks boring and routine, your audience probably won't bother to read it. Yet a few simple enhancements can make that report look as interesting and impressive as the information it contains.

For this month's document make-over, we selected a 30-page, laser-printed technical report submitted by G. Fred Lee & Associates, an El Macero, California, environmental sciences research group. Like scores of other 8½-by-11-inch, double-sided reports, the document's format is an intimidating single column of wall-to-wall text, broken up only by subheads, bulleted lists, and an occasional table or figure.

In submitting its document, Lee & Associates asked us if using different fonts and a multicolumn format could improve the material's readability and impact. As the make-over pages demonstrate, our answer was yes.

In our redesign, we replaced the original Times Roman typeface—an efficient but commonplace workhorse—with the more elegant and inviting Palatino, which provides both legible body text and lively headline-size type. In addition, we replaced the single 40-pica–wide column with two 18-pica–wide columns separated by 2 picas of white space and a hairline vertical rule. The shorter, narrower columns make it much easier and more inviting to read the text.

To help give structure and definition to the material, we added a horizontal rule at the top and bottom of each page. Rules like these also serve nicely as graphic enhancements that enliven the look of the documents.

To strengthen the report's identity and make it easier for readers to locate necessary information, we also added a cover page and a table of contents. The cover page serves to identify the report, while the contents page makes it much easier for readers to peruse and assimilate the information contained in the report and then locate specific sections to which they might like to refer.

In the table of contents we incorporated a standard numbering system (1, 2, 3 and A, B, C) to help organize

BEFORE

Assessment of Impairment of Beneficial Uses of Receiving Waters
Associated with Exceedance of NPDES Discharge Limitations

G. Fred Lee, Ph.D., P.E. and R. Anne Jones, Ph.D.
G. Fred Lee & Associates
El Macero, CA 95618
(916) 753-9630

INTRODUCTION

In April 1991, the California Water Resources Control Board (WRCB) adopted the Inland Surface Waters, and Enclosed Bays and Estuary Plans that incorporated many of the US EPA water quality criteria as state of California water quality objectives (standards). The purpose of the Plans and associated objectives is to meet the federally mandated requirement to protect the designated beneficial uses of the waters of the state. Beneficial uses can include fish and aquatic life, domestic water supply, recreation, agricultural water supply, wildlife habitat, etc., and are established for each waterbody in California by the appropriate Regional Water Quality Control Board (WQCB) after public hearing and approval by the WRCB and the US EPA.

At this time, Regional WQCB's are implementing the April 1991 water quality objectives into NPDES discharge limitations. Those discharge limitations are being developed in such a manner to prevent the concentrations of total forms of contaminants from exceeding the water quality objective at the edge of the mixing zone of the effluent with the receiving water. For discharges to dry streams, the concentrations of total forms of contaminants in the effluent are not to exceed the water quality objectives. Dischargers are also being required to meet toxicity limitations in their effluent and receiving waters. Many dischargers are finding that their proposed revised NPDES permits are significantly more stringent than current permit conditions in order to prevent exceedances of the 1991 water quality objectives and effluent toxicity limitations. The implementation of the US EPA's November 1990 stormwater contaminant control programs for urban areas is resulting in municipalities' (and presumably industries') being issued NPDES permits that require that the April 1991 objectives be met in waters receiving stormwater discharges. There is growing concern about the use of those objectives as a basis for regulating stormwater runoff especially to intermittent streams. As discussed by Lee and Jones (1991d,e) the use of the US EPA water quality criteria and water quality standards (objectives) equivalent to them, to establish NPDES permit conditions will, in most instances, lead to the construction of excessive treatment works and/or to the development of unjustified contaminant control programs beyond those needed to protect designated beneficial uses of receiving waters. While those problems can occur for discharges to any waters of the state, they will be especially acute for effluent-dominated streams and intermittent streams.

If the NPDES discharge limitations based on the 1991 objectives are violated or are expected to not be met by current practice, a discharger can pursue several courses of action. The first would simply be to provide the degree of treatment-control necessary to meet the revised discharge limitations. For many discharge situations and for many constituents that approach can be significantly more costly than necessary to protect the designated beneficial uses

AFTER

1

TECHNICAL REVIEW

Assessment of Impairment of
Beneficial Uses of Receiving Waters
Associated with Exceedance of
NPDES Discharge Limitations

G. Fred Lee, Ph.D., P.E.
and R. Anne Jones, Ph.D.

G. FRED LEE & ASSOCIATES
EL MACERO, CA 95618
(916) 753-9630

2

and clarify the hierarchy of headings.

Finally, we recommended replacing the original binding technique—a single staple in the top-left corner—with a more professional method, such as a plastic comb inserted into prepunched holes. Several styles of inexpensive, attractive binding are available, and they can dramatically improve the look and feel of your next report.

Mail your publishing and presentation questions to Publishing & Presentations, PC World, *501 Second St. #600, San Francisco, CA 94107. PC World pays $50 for each published question. Sorry, we cannot acknowledge unpublished materials.*

Contributing editor Richard Jantz is a computer publishing consultant in Berkeley, California. Larry Westdal, a graphic designer with Westdal Design Associates in Berkeley, California, also contributed to this article.

1 **A cover page with generous white space lends an air of importance to the material and invites readers to investigate further. The main title is set in 20-point Palatino with 26-point capital letters; other cover page text is set in 14-point Palatino with 20-point caps.**

2 **Rules can effectively strengthen a technical document's visual identity. We used a pair of repeating horizontal rules—a 2-point rule at the top and a hairline (¼ -point) rule at the bottom of each page—to help integrate the information and unify the report.**

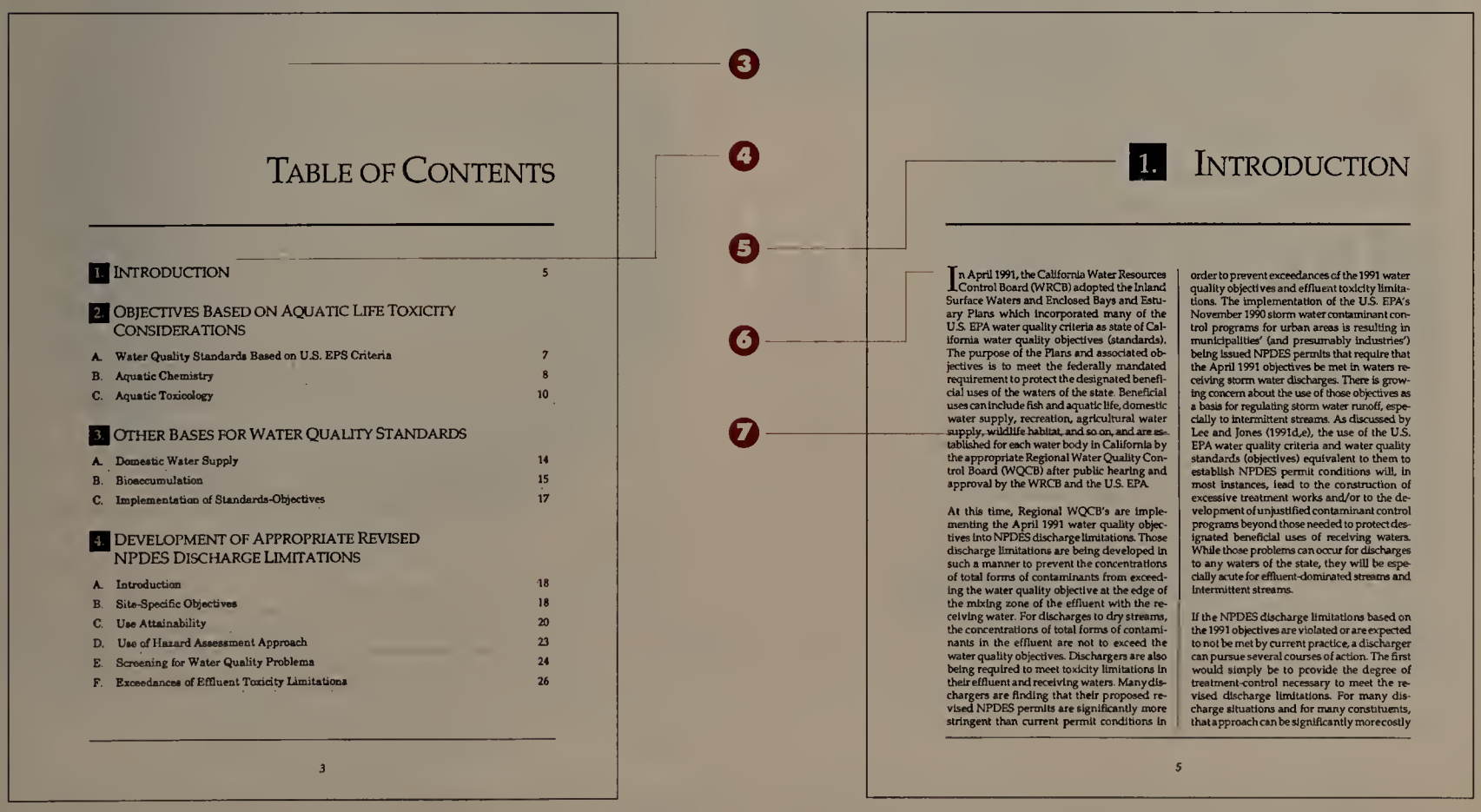
3 **We added a much-needed contents page to help readers quickly grasp the categories of information in the report and to enhance the perceived value of the document.**

4 **Using different type sizes and adding numbers to the section headings help clarify the sequence of information. First-level heads are set in 14-point Palatino with 16-point caps; second-level heads are 11-point Palatino. We also reversed out the numbers to make them graphic elements that help enliven the page.**

5 **Main heads are set in 26-point Palatino with 36-point caps and are right justified (or flush right). Longer heads can be placed higher on the page but should always end on the same baseline as this head ("Introduction").**

6 **A 36-point Palatino initial cap sets off the first paragraph in each new section of text, which is 11-point Palatino with 13 points of leading.**

7 **We replaced the single 40-pica–wide column with two 18-pica–wide columns; the shorter column width makes it much easier to read the text. We separated the columns with two picas of white space and a vertical hairline rule.**



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1. INTRODUCTION

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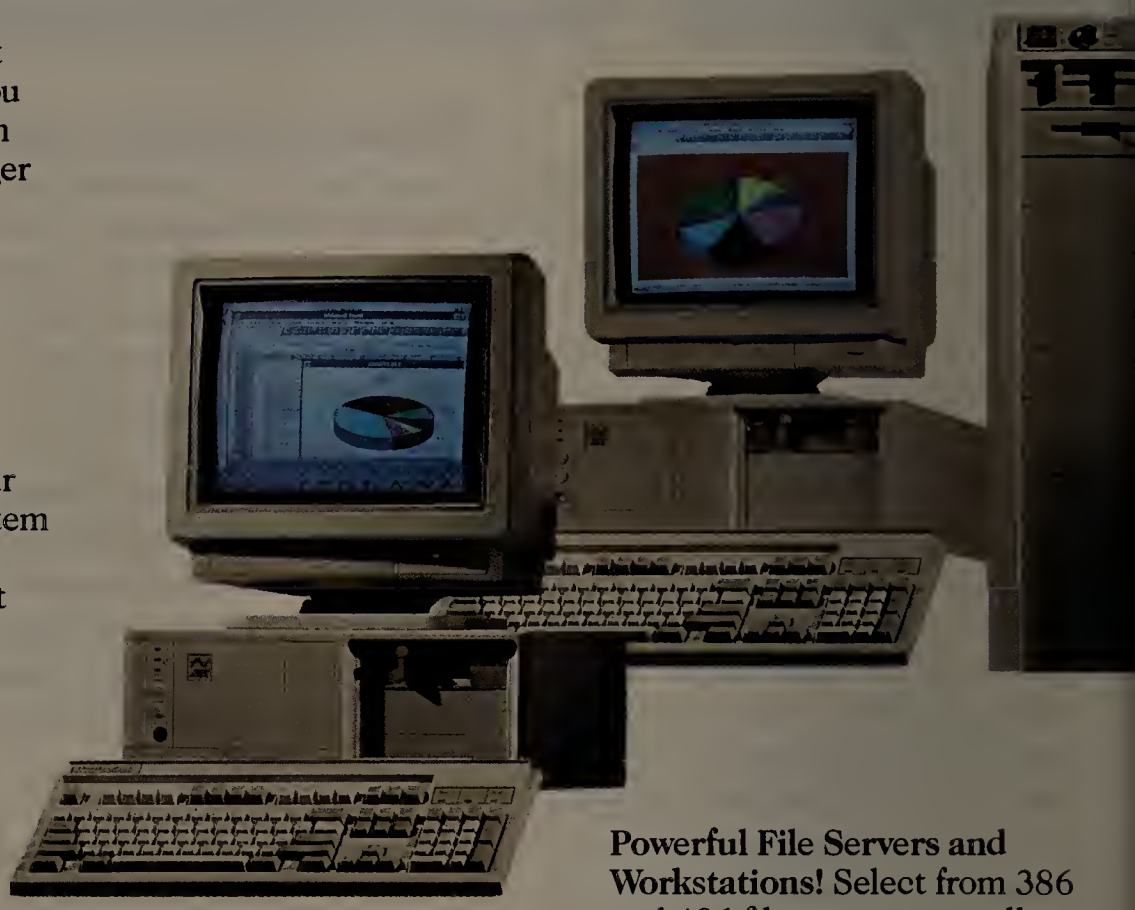

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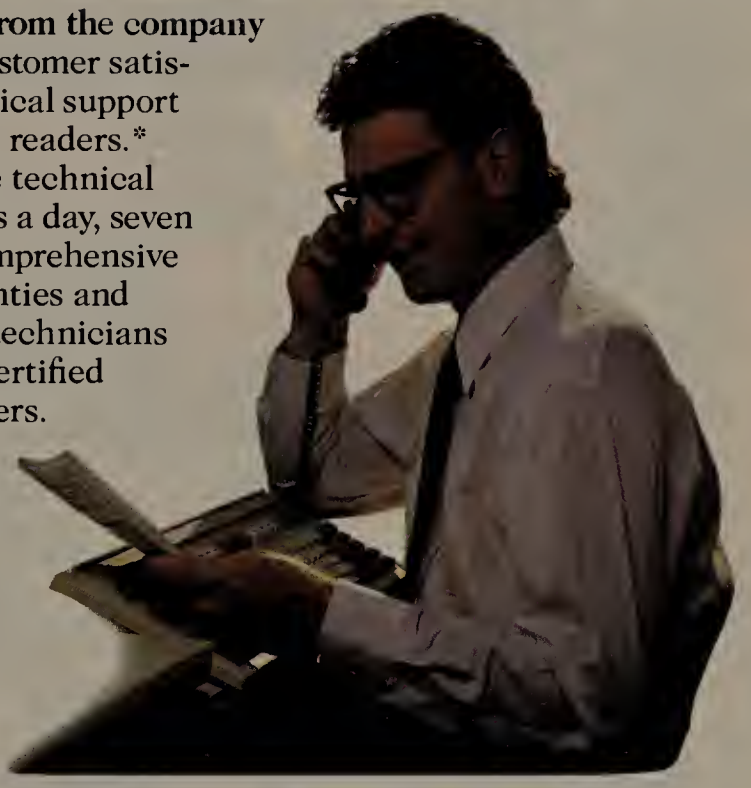

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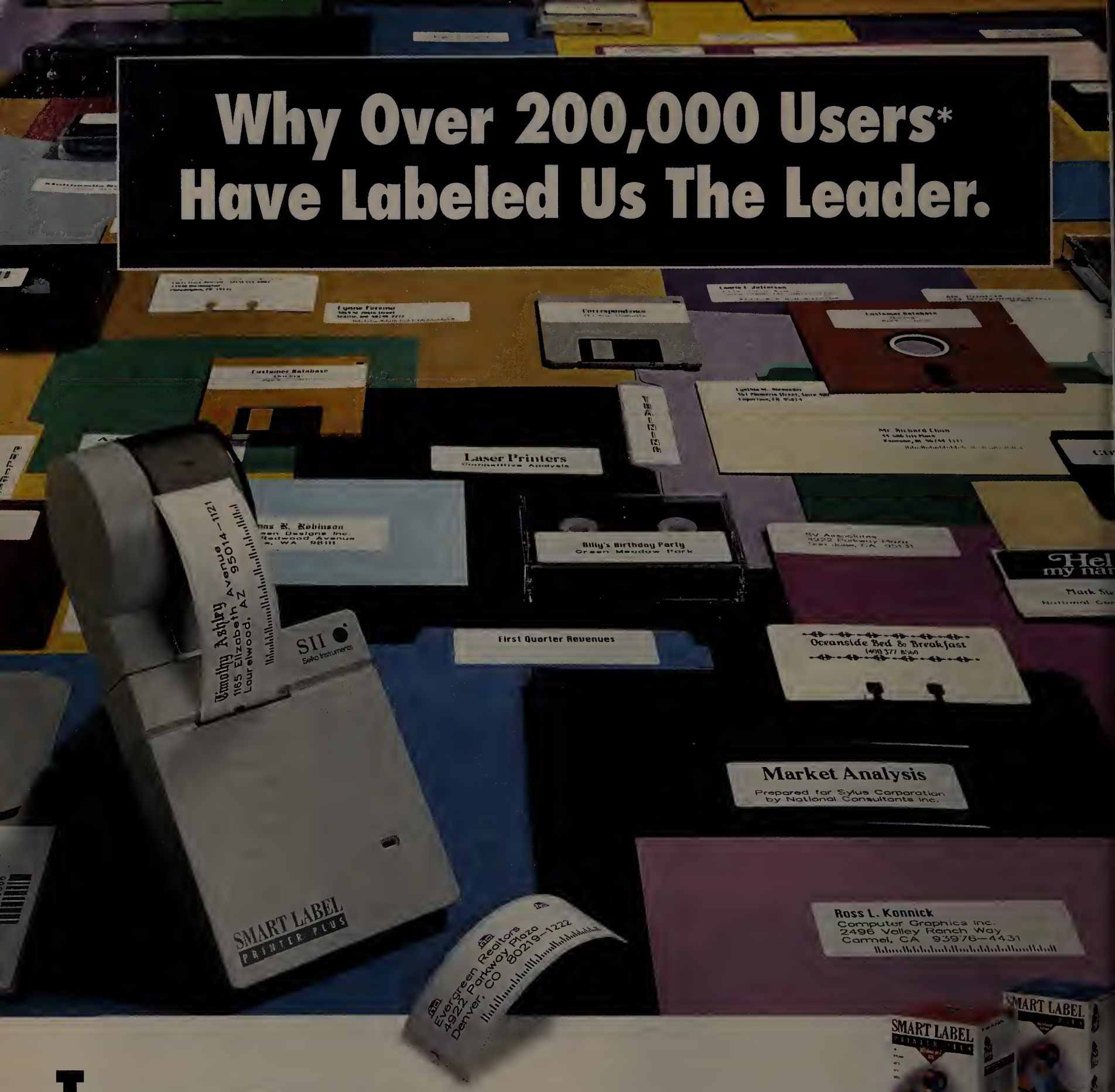

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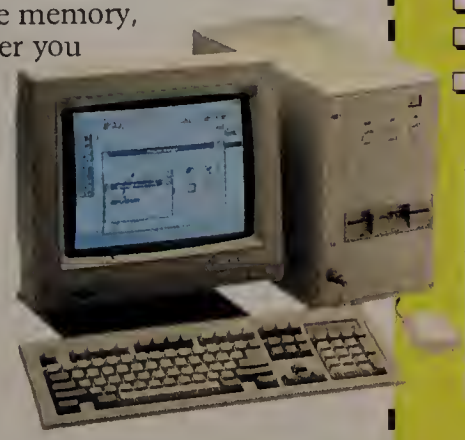

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COMMUNICATIONS Q&A

BY JUDY HEIM

On-line resources for business and professional users

Q. *I recently upgraded to* Procomm Plus 2.01. *Often, when I'm in the middle of capturing an enormous text file to disk,* Procomm *silently aborts the transfer, leaving me with little to show for my efforts. Is there a fix for this?*

DAVID GJERSTON
OLYMPIA, WASHINGTON

A. This has got to be *Procomm*'s most annoying quirk. *Procomm* aborts a data transfer when there is a sufficient lull in the transmission. The length of time *Procomm* considers sufficient is determined by the ASCII download timeout value. You can increase this value and eliminate the problem. Press **<Alt>-S** to get the *Procomm* setup screen. Choose *Protocol Options,* then *ASCII Protocol Options.* Press **H** for 'ASCII Download Timeout', type **50,** and press **<Enter>** to increase it to 50 seconds (give it a high value, to be sure). Back out to the initial setup screen by hitting **<Esc>** twice. Save the new value by choosing *Save Setup Options.*

Q. *Why do the closing stock quotes on Prodigy, CompuServe, and other on-line services often differ from what appears in my evening paper?*

REBECCA COWEN
LONG ISLAND, NEW YORK

A. Not all on-line stock quotes are equal. Nor are all newspaper quotes. The reliability of stock prices that you download from on-line services varies greatly with the service. Why? Because each service buys its quotes from a different source. There are profound differences in the care with which those sources process the raw trade data transmitted to them by the exchanges.

To give you an idea of the complexity of the process, Dow Jones News/Retrieval (which provides stock quotes for Prodigy) employs a staff of ten who do nothing but monitor the feeds from the various exchanges throughout the day. The exchanges don't send neat price lists, with the day's highs and lows, all recorded. They telecommunicate the price of each trade, one transaction at a time, immediately after a clerk at the exchange types it into a computer.

Dow Jones sorts this discombobulated data stream; tabulates the day's highs, lows, and volume; and even determines the last trade of the day. Equally important, Dow checks whether the data is reliable, whether those harried exchange clerks typed the prices accurately (often they do not), or whether the numbers fired down the 9600-bps dial-up phone line were jumbled by line noise.

Staffers eyeball the printouts—scanning for wildly improbable price fluctuations from one trade to the next—and use computer analysis to hunt for errors. Often the Dow staff makes the exchange staff stay late and retransmit the entire day's trade data.

When some disgruntled customer calls Dow Jones and asks why yesterday's closing price for Merck, as listed on Prodigy, differs by 2 points from that in their evening paper, the Dow staff rechecks the prices, calls the exchange, and tries to verify the data. Often data at the exchanges is in such a state of chaos that the exchanges themselves aren't sure of the previous day's highs.

How can you tell if the stock prices on your on-line service are accurate (and there *are* differences, believe me)? Ask around. Other users of the service are your best source. One rule of thumb is to look at the day's highs and lows. If those prices regularly differ from those in your newspaper, you know that the quote provider's processing is sloppy.

Q. *You used to be able to search CompuServe's member directory by user interest and location to find, say, skiers in Minnesota. Now you can search only by name and I.D. Why did CIS abolish this feature?*

LAMBERT MAYER
PARIS, FRANCE

A. According to CIS evangelist Sharon Baker Magee, CIS pruned its member directory to speed up searching. The expanded membership had made it cumbersome. "We eliminated 'interests' from the main directory," she says, "and created user directories in the forums that provide detailed information on users' interests." So you now have to go to the forums and pay bucks to find users who share your interests.

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Judy Heim is a contributing editor for PC World.

ANTHONY RUSSO

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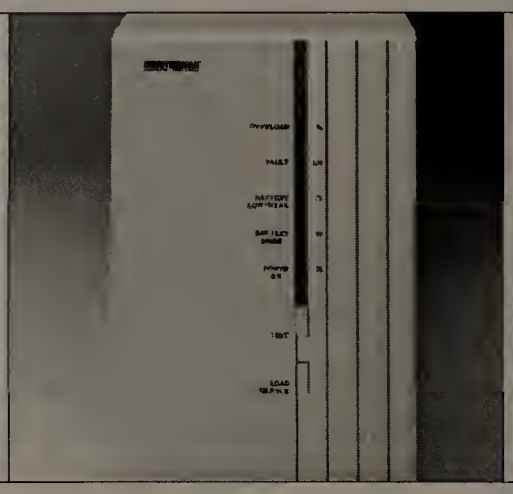

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WINDOWS WORKSHOP

BY SCOTT DUNN

Practical answers to your questions about Windows

Q. *I recently upgraded to* Windows 3.1 *and got a new text editor. To associate all my TXT files with my new editor, I followed the advice you gave in August 1991's* Windows Workshop. *In WIN.INI's [extensions] section, I inserted TXT= before and ^.TXT after the path and name of my new program's executable file. But when I double-click on a TXT file in File Manager, the file loads in Notepad instead of in my new program. What gives?*

WILLIS O. PICKERING
BELLEVUE, WASHINGTON

A. *Windows 3.0* used the [extensions] section to keep track of the three-letter file name extensions that are associated with each application. By double-clicking on a file name ending in a particular extension (for example, CAL), you could launch the associated program (in this example, CALENDAR.EXE) and automatically open the file in that application.

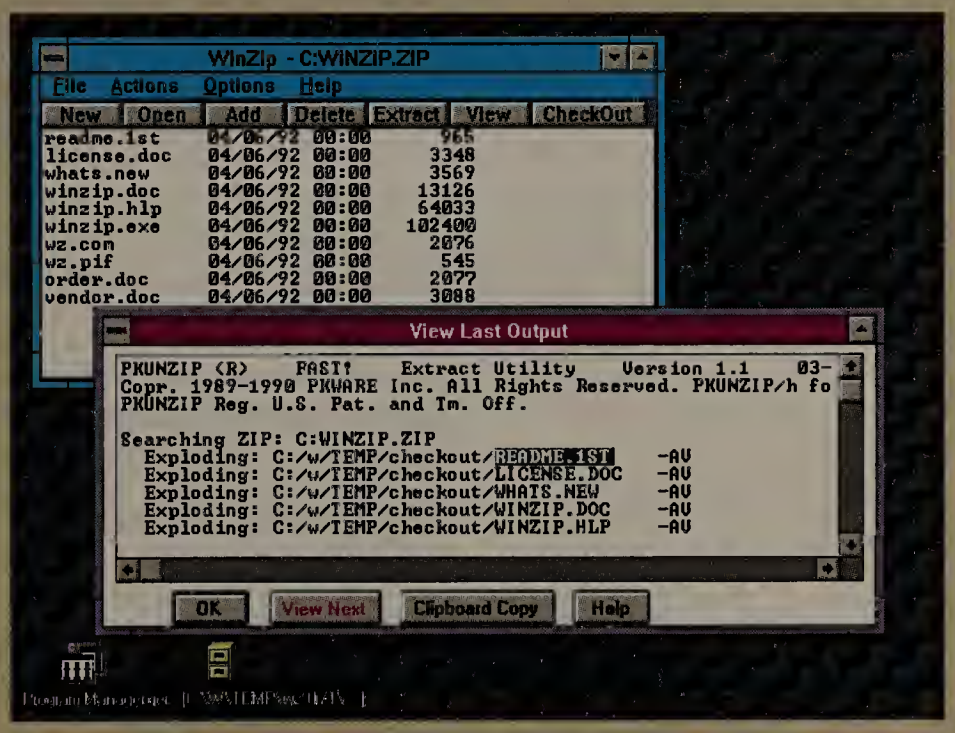
Windows 3.1 still has this capability, but it stores the associated information elsewhere. The [extensions] section is maintained in WIN.INI for compatibility with other programs (such as *WinBatch* from Wilson WindowWare).

To update several extensions at once, you need a program called Registration Info Editor (Regedit, for short). It comes with *Windows 3.1*, though it doesn't appear as an icon in Program Manager. To fix that, drag the file name REGEDIT.EXE from File Manager (\WINDOWS directory) to a program group in your Program Manager window. This creates a Regedit icon.

Double-click the Regedit icon, select *Text File* from the list of registered file types, and choose *Edit•Modify File Type*. In the Command text box, delete the current Command reference (notepad.exe %1) and type your new program's path and executable file name (if necessary, use the Browse button to find it on your disk). After the file name, add a space and **%1**. This represents the data file you're trying to load.

You can also use Regedit to add new programs and file types to File Manager's Associate dialog box. Say you want all TMP files to open in your new word processor. From Regedit, select *Edit•Add File Type*. For the identifier, create a one-word description, such as TMP. Fill in the file type (for example, **Temporary**), and make sure Action is set to *open* so double-clicking a name in File Manager will open rather than print the file.

Windows Toolbox



With the rising popularity of both *LHA* and *PKZIP* compression utilities for DOS, you need a *Windows* program that can act as a shell for both. Enter *WinZip*, the perfect *Windows* interface for *LHA, PKZIP, ARC,* and your favorite DOS virus scanner. *WinZip* runs these utilities transparently. And the convenient button bar makes these once-cumbersome chores a snap. Available for $29 including shipping from Nico Mak, P.O. Box 919, Bristol, CT 06011-0919. For credit card orders, contact the Public (software) Library (PsL), 800/242-4775, 713/524-6394, 713/524-6398 (fax), or 71355,470 on CompuServe.

Type in the program's path and executable file name followed by a space and **%1** as before. As long as your program doesn't require Dynamic Data Exchange to open a file from File Manager, ignore the rest of the dialog box.

Now open File Manager, highlight any file ending in the extension you want to associate, and select *File•Associate.* The word 'Temporary' now appears on a pick list. Choose it, select *OK,* and anytime you double-click a TMP file, your word processor will load that file.

Naturally, you can still associate files by entering your program's path and file name in File Manager's Associate dialog box. But that requires you to enter each program name manually, even if you've already entered it once for a different extension. By adding new file types with Regedit, it's easy to make point-and-click adjustments from File Manager's Associate list.

Q. *I like using System Configuration Editor to edit my* Windows *and DOS system files, but whenever I work on a network workstation that has no hard drive, Sysedit gives me an error message because it can't locate the AUTOEXEC.BAT and CONFIG.SYS files on the C: drive. What can I do to make Sysedit find these files on my network boot disk in drive A:?*

CONNIE WONG
PHOENIX

A. First, make a backup copy of SYSEDIT.EXE, which is found in *Windows'*\SYSTEM directory. Next, open SYSEDIT.EXE in *Windows* Write. Click *No Conversion* when you're asked whether to convert the file to Write format. Select *Find•Find* to locate **C:\AUTOEXEC.BAT**, and change the 'C:' to **A:**. Do the same for C:\CONFIG.SYS and save the file. If you decide to use the *Save As* command to give SYSEDIT a new name, be sure that you save it as a text file.

Q. *According to the* Windows 3.1 *manual, I should be able to change the fonts of my DOS program when I run it in a window. This has never worked for me, because Font doesn't appear on any control menu.*

HERB ABELSON
PRINCETON, NEW JERSEY

A. This feature works only if you're using display drivers—specifically a component file known as a "grabber"—designed for *Windows 3.1.* It's best to use one of the drivers that come with *3.1,* or contact the manufacturer of your driver to get the latest files.

If that's not possible, try this. First, make a backup copy of SYSTEM.INI. Choose *Run* from Program Manager's File menu, type **SYSEDIT**, and press **<Enter>**. In the SYSTEM.INI window, find the [NonWindowsApp] section and add the line **FontChangeEnable=1**. Save SYSTEM.INI and restart *Windows.* Note that this fix doesn't work with all systems and can have side effects (lost characters, changed cursor size).

Sometimes you can use the grabber file from one set of drivers with another set. For example, the grabber that comes with the Tseng ET4000 drivers (free from the Microsoft BBS, 206/637-9009 or 206/936-6735 for 9600-bps access) works with the *WinSpeed* drivers from Panacea. To use a different grabber, open SYSTEM.INI and in the [boot] section, find the line that begins '386grabber='. Replace the file name to the right of the equal sign with the new grabber file. In the case of our example, the line would read **386grabber=v7vga.3gr.** Save SYSTEM.INI and restart *Windows.* If it doesn't work, restore the old SYSTEM.INI from your backup.

Q. *I run* Windows 3.0 *in 386-enhanced mode, and I don't have enough space on the drive where* Windows *resides to devote to a permanent swap file. But* Windows *creates a temporary swap file whenever I start it. Can I get* Windows *to swap to a RAM drive or at least a different disk drive?*

PAULA NORTHUP
KANSAS CITY, MISSOURI

A. The purpose of a swap file is to provide simulated (virtual) memory after you run out of real RAM. So to steal part of your RAM to create a RAM disk and then give it back to yourself in the form of a swap file makes no sense.

You can, however, tell *Windows* to use a different physical drive for your temporary swap file. First, make a backup copy of SYSTEM.INI. Then in Program Manager, select *File•Run* and type **SYSEDIT**. Click the SYSTEM.INI window to bring it to the front, and search for the [386Enh] section. Under that heading, type **PagingDrive=***e:*, replacing *e:* with the letter of the drive for your temporary swap file.

You can also reduce the amount of space a temporary swap file can consume. For example, to limit a temporary swap file to 2MB of disk space, type the line **MaxPagingFileSize=2048** in SYSTEM.INI's [386Enh] section.

On the other hand, if you just want to make sure you always have a certain amount of disk space free, say 5MB, add the line **MinUserDiskSpace=5120** instead. This forces the swap file always to leave at least 5MB free on the disk containing your temporary swap file.

Finally, if your disk becomes too full for a swap file, add the line **Paging=off** to this same section. This prevents *Windows* from creating a temporary swap file but lets you run in enhanced mode.

Except for minor changes, all these settings work in *Windows 3.1* as well. However, the newer version lets you control most of these settings from Control Panel (386 Enhanced icon) without mucking around in SYSTEM.INI.

Mail your questions to Windows Workshop, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Windows Workshop; CompuServe, 74055,412; MCI Mail, PC World Editorial; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

Scott Dunn is coauthor of 101 Windows Tips *(Peachpit Press, Berkeley, California, 1992).*

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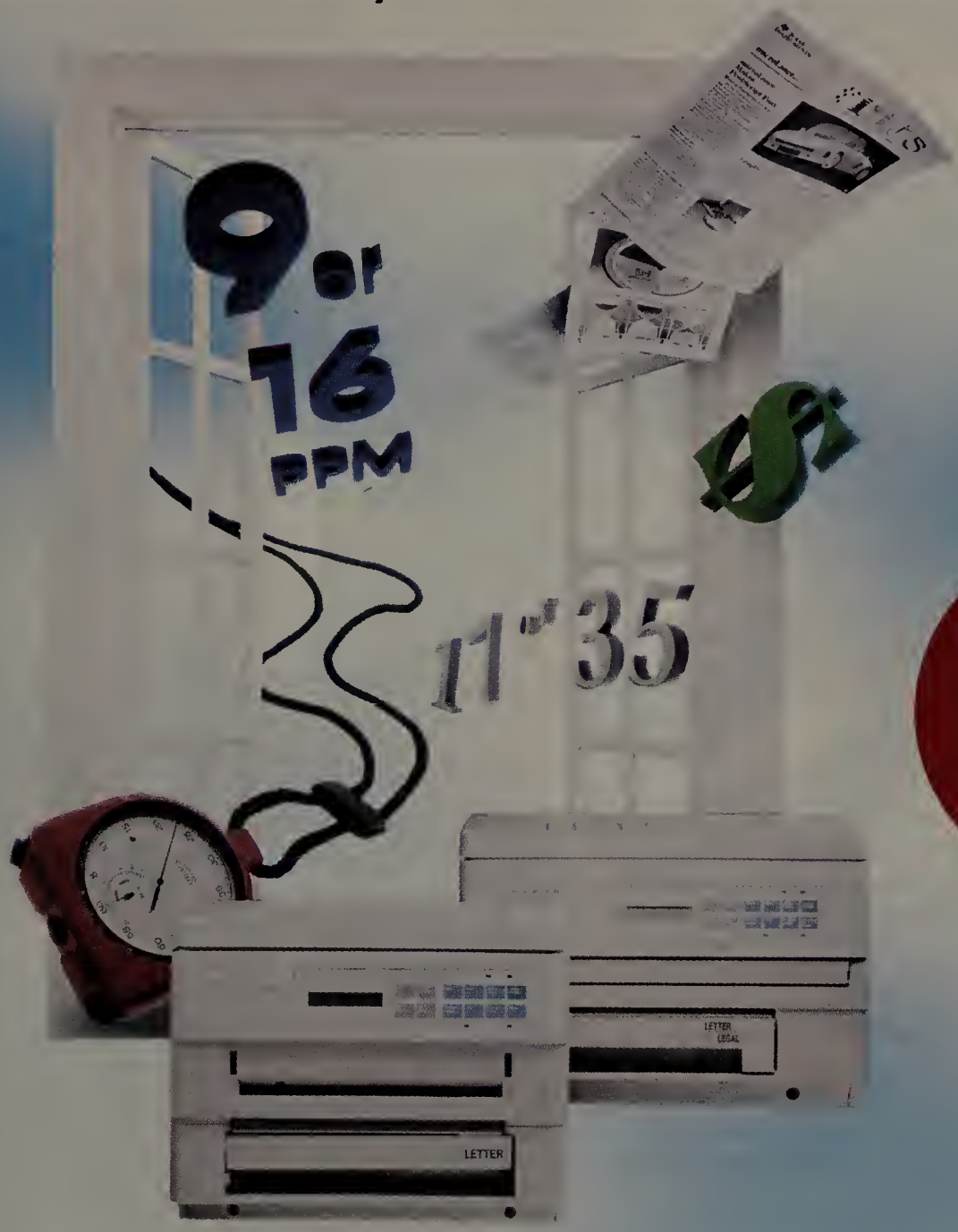

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MacUser ★★★★½

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Not only does PostScript give you scalable outline fonts and graphics, it also means that your microLaser works in computing environments like Windows, DOS®, Apple® Macintosh®, OS/2® and UNIX®.

2. Performance POSTSCRIPT® Software From Adobe

When it comes to printing high-quality documents fast, microLaser really makes you look good. At either nine or 16 pages-per-minute, microLaser printers speed you through documents in a hurry. Plus PostScript means what you see on your screen is what you get on paper. You can even turbocharge your microLaser with a RISC processor for blazing fast graphics.

3. Reliability When you buy a printer, you want it to print. And print. And print. That's just what the microLaser does.

Take our personal microLaser Plus for example. With its high duty cycle of 10,000 pages-per-month* and a standard one-year limited warranty**, you can rely on your microLaser to work the first time, every time, for years.

4. Value Starting as low as $999†, there's a microLaser designed to fit any budget. From the single user all the way up to a network. Consider this, too: microLaser's average cost per page is only 1.9 cents‡, while some laser printers average around 3.3 cents. The microLaser not only makes sense, it saves you money, too.

PC WORLD BEST BUY

For details on the right microLaser for you and the name of the nearest dealer, call

1-800-527-3500.

The microLaser PS17 has earned the 1990 *PC World* Best Buy award; microLaser PS35 has earned the 1990 *InfoWorld* Excellent Value award and 4½ mice from *MacUser*, October 1990.

Features	microLaser Plus Basic	microLaser Plus PS17/PS35	microLaser Turbo	microLaser XL Turbo
PPM	9 ppm	9 ppm	9 ppm	16 ppm
Emulation	HP LaserJet II	HPLJII/PostScript	HPLJII/PostScript II	HPLJII/PostScript II
Processor	68000	68000	RISC/8220	RISC/8220
Fonts	14 HP Fonts	17 or 35 Scalable	35 Scalable	35 Scalable
List Price	$999	$1,399/$1,499	$1,749	$3,649

TEXAS INSTRUMENTS

*Based on estimated typical usage. **For more information on service upgrade options, call 1-800-847-5757 in the U.S. and 1-800-268-6314 in Canada. †Suggested retail price — dealer prices may vary. ‡Based on suggested retail price of consumables and approximate page coverage rating for each consumable at 4% black (toner, developer and OPC). microLaser is a trademark of Texas Instruments Incorporated. Microsoft and DOS are registered trademarks, and Windows is a trademark of Microsoft Corporation. Adobe, PostScript and the PostScript logo are registered trademarks of Adobe Systems Incorporated which may be registered in certain jurisdictions. LaserJet is a registered trademark of Hewlett-Packard, Inc. Apple and Macintosh are registered trademarks of Apple Computer, Inc. OS/2 is a registered trademark of International Business Machines Corporation. UNIX is a registered trademark of AT&T. ©1992 TI 76539

Circle 242 on reader service card

Compudyne™. Latest Technology. Highest

Compudyne is the PC manufacturing and direct marketing arm of CompUSA,™ the Computer SuperStore (NASDAQ symbol; CUSA)—inventors of big volume, deep discounting PC retailing, and the largest chain of computer super stores in the country. Compudyne manufactures top quality, fully-supported computers as available from only the largest PC manufacturers at prices typically found only at garage shop clone houses.

Result? We're already one of the largest direct PC companies in the country and guarantee that our prices are the lowest of any currently advertised!

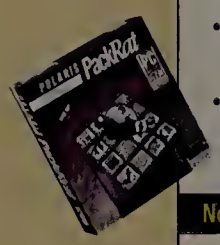
We are to PC prices what "The Rhapsody for Subsonic Tubas" was to music. Some notes were so low, no one could hear them. Requests for an encore were even lower.

Compudyne is probably the fastest growing PC company in the history of the industry.

Notebooks

Feast your eyes on "one of the best notebook values around" (Mobile Office 7/92), snugly packed into a slim, trim, 5.5 lb package (including battery).

- 11"x 8.5"x 1.6" (yes, only 1.6" thick!)
- Full 10", 64 grayscale brilliant VGA screen
- Internal 3 1/2" 1.44 MB floppy drive
- Built-in trackball saves carrying a mouse
- Microsoft® Windows 3.1 installed ready to run
- Polaris PackRat 4.0™ Personal Information Manager™
- External SVGA monitor and keyboard support
- Toshiba-compatible external expansion bus
- User-installable FAX modem and other options
- Full keyboard—dedicated 'page up/down', 'home' and 'end' keys
- Built-in serial (2) and parallel (1) ports
- FCC Class B certification



Notebook	CPU	RAM (MBs)	HD (MBs)	Battery Life (Hrs)	Price
386SXL/25	386SXL–25 MHz, Optional 80387SX	2 standard, 4 & 6 options	60	3+	$1,599 $59/mo*
386SL/25	Intel 80386SL–25 MHz, 64 K CPU cache Advanced SL power management, Optional 80387SX co-processor	as above	80	3+	$1,899 $70/mo*
486SX/25	Intel 80486SX–25 MHz, Built-in 8K CPU cache	4 standard, 8 & 20 options	80	2.5+	$2,199 $81/mo*
486DX/33	Intel 80486DX–33 MHz, Built-in 8K CPU cache	as above	130	2.5+	$2,999 $111/mo*

We are to notebooks what Griselda of Skyland was to Pomeranians; the lightest.

ORDERING

- 1-800-932-COMP (2667)
- International callers dial: 1-214-702-0055
- 24 hour fax: 1-214-702-0300
- Corporate credit and volume terms available.

DISCOVER MasterCard VISA

HOURS OF OPERATION

- 8am-7pm (CST) Mon.-Fri. and 9am-5pm (CST) Sat.

WARRANTIES

- 30-day, no questions asked, return policy.√
- 1 year limited warranty.

SERVICE & SUPPORT

- Toll-free technical support
- On-site service for desktops†† and overnight replacement for portables.
- Next-day shipping for most systems.

†† Within 100 miles of any Dow Jones Service Center **Does not include Windows 3.1 or mouse √ Must be returned "as new" in original packaging

Quality. Lowest Prices. Guaranteed.

Desktops

Order one of our pre-configured systems or custom-configure your own, choosing from a myriad of options. All systems include...

- Microsoft® Windows 3.1 installed ready to run
- Microsoft compatible serial mouse
- 200 watt power supply
- 101 AT-style keyboards
- FCC Class B certification
- Built in serial (2), parallel (1) and game (1) ports
- Artisoft's LANtastic® LAN
- 8 i/o board slots
- U/L listing

MICROSOFT® WINDOWS™ READY-TO-RUN

Get Horizontal...

Our standard desktop systems feature aesthetic, yet rugged, plastic over steel construction, with "one screw" assembly for quick, easy upgrades. They support 3 externally accessible 5.25" drive bays and 2 internal 3.5" units.

Get Vertical...

For those who prefer the aesthetics and footprint of a desktop tower or need the added drive capacity for file server applications, our mini tower offers an astonishing 6 drive capacity; 4 external plus 1 internal 5.25" and 1 internal 3.5" unit in a mere 8"x 16" footprint, for only $75 more.

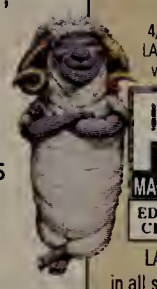
Options, Options, Options...

- Displays: Mono or color VGA; 1024 and 1280 interlaced or non-interlaced; 14" to 20"
- Hard Drives: 40; 80; 105; 120; 211; 483; 680 MBs or 1.2 GBs
- Internal CD-ROM (Inc. Groliers Encyclopedia, Toolworks, Reference Library and PC-SIG)
- Internal FAX/Modem: 9600 bps send/receive fax; 2400 bps modem; inc. WinFax and Quicklink Software.
- And many more!

PRICE Guarantee

If you can find a PC that meets or exceeds our equivalent specification, but is shipping at a lower advertised price, we'll match the price.

intel inside



4/14/92 LANtastic ver.4.1

PC MAGAZINE EDITORS' CHOICE

LANtastic in all systems!

Desktop	CPU	RAM (MBs)	HD (MBs)	Floppy	Display	Price
386SX/25	Intel 80386SX–25 MHz	1 standard 32 max	50	1.2 or 1.44	16 bit SVGA card, 14" 640x480 VGA Color Monitor	$899** $33/mo*
386DX/33	Intel 80386DX–33 MHz	2 standard 32 max	80	as above	as above	$999 $37/mo*
486SX/25	Intel 80486SX–25 MHz Built-in 8K CPU cache	as above	105	1.2 & 1.44	16 bit SVGA card, 14" 1024 x768 SVGA Color Monitor	$1,299 $48/mo*
386DX/33 CACHE	Intel 80386DX-33 MHz 64K CPU cache EXTRA CACHE	4 standard 32 max	105	as above	16 bit SVGA card, w/ 1MB video RAM & Hi-Color Support, 14" 1024 x768 SVGA Non-Interlaced Multisync, Color Monitor	$1,499 $56/mo*
486DX/33 CACHE	Intel 80486DX–33 MHz 128K CPU cache	4 standard 64 max	130	as above	as above	$1,799 $67/mo*
486DX2/50 CACHE	Intel 80486DX2–50 MHz, 128K CPU cache New Double Clock CPU	as above	130	as above	as above	$1,999 $74/mo*
486DX/50 CACHE	Intel 80486DX-50 MHz 128K CPU cache, True 50 MHz CPU	8 standard 64 max	210	as above	as above	$2,499 $89/mo*
486DX2/66 CACHE	Intel 80486DX2–66 MHz, 128K CPU cache New Double Clock CPU	as above	210	as above	as above	$2,999 $111/mo*

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Circle 14 on reader service card

DPMI 386SX NETWORKS TSRs BLUEMAX QUALITAS® 386MAX ROM LIM EMS HMA DOS 5.0 XMS BUFFERS UMB RAM PAGEFRAME IPX MEMORY BIOS CACHE VGA MOUSE 386 DPMI HIGH DOS EGA INITIALIZE 486 WINDOWS DOS 5.0 XMS BUFFERS C&T 286

Don't buy a memory manager without examining these critical issues.

"Our top-scoring memory manager is Qualitas' 386MAX Version 6.0."

InfoWorld 12/9/91

PC MAGAZINE EDITORS' CHOICE

February 11, 1992
386MAX 6

"Get Windows' EMM386.SYS off your disk and put MAX to work."

Jim Seymour, PC Week
"Now for the Best 'Little' Products of 1991"
12/23/91

1991 BYTE AWARD OF MERIT

"386MAX finds every little piece of memory and makes the most of it...You won't go wrong with 386MAX."

Doug van Kirk, PC Computing, 12/91

New 386MAX® 6 maximizes system performance more easily, completely and automatically than any other memory manager you can buy.

A fact documented by the leading editors of today's top PC publications. All of whom rate 386MAX 6 the top choice in memory management.

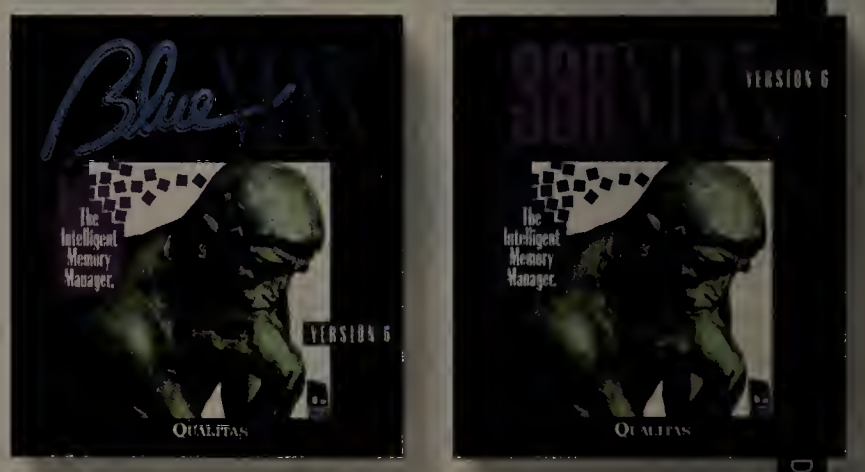
That's because 386MAX does a superior job of evaluating every aspect of your system. Recovering as much high DOS as possible. Then using its advanced new memory management tools – like ROMsearch,™ VGAswap,™ and Maximize Reordering – to optimize and configure your system for maximum usable memory. And maximum performance.

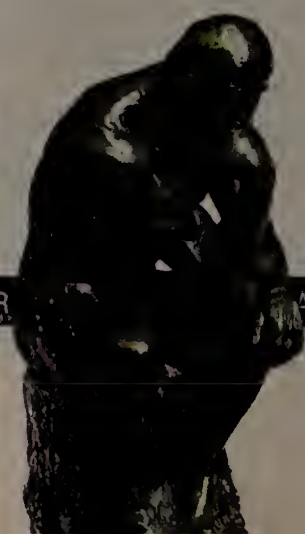
And if you thought Windows and DOS 5 were good at handling memory, try teaming them up with 386MAX. You'll have the ultimate memory management solution. With better all-around performance than you'll get from either one alone. Or with both.

Choose new 386MAX 6 for IBM compatible 386 or 486 systems and 286 systems with Shadow RAM for just $99.95. Or new BlueMAX™ 6, the only memory manager that delivers up to 250% more memory on all 386 and 486 IBM PS/2s for only $124.95.

See your dealer or call toll-free today.

800-676-9386 ext. 200





The Intelligent Memory Managers™

R A DOS 5.0 XMS BUFFERS UMB 386MAX 486SX DRIVERS 386SX NETWORKS 486 DOWS 640K

© *1992 Qualitas.* Qualitas, 7101 Wisconsin Avenue, Suite 1386, Bethesda, MD 20814. *All company and product names are trademarks or registered trademarks of their respective owners.* **System Requirements: Any 386, 386SX, 486 or 486SX PC or PS/2, min. 256K of extended memory, DOS 3.0 or higher, and hard disk drive. (386MAX also supports 286 machines with Shadow RAM, or any PC with EMS 4.0 hardware with 256K memory. Feature availability and memory recovery may vary on these systems.)**

Circle 236 on reader service card

USER GROUP TIPS

Helpful hints from members of the nation's user groups

Quick Cell Formatting With Quattro Pro 4.0 or Excel

Are you stuck in the tedious cycle of resetting formatting attributes for groups of cells one by one? And does this repetitive sequence sound familiar: *Numeric format, Reset, Font, Reset, Alignment, Reset*...?

You can take a quick and nifty detour around this time-wasting procedure via *Excel*'s Paste Special and *Quattro Pro 4.0*'s Edit Copy Special commands. These commands behave just like the Edit Copy Paste and Edit Copy commands, but with an invaluable twist. You can use them to copy only the formatting from the source cell to the target cells, leaving the contents of the target cells untouched. So if you use an unmodified cell as the source, you'll reset the target cells to the default format.

Excel adds another neat trick: After using Edit Copy (or <Ctrl>-<Ins>) on the cell that's the source for the format, you can select discontiguous groups of target cells by holding down <Ctrl> as you select each new group. Paste Special will reformat them all at once.

GENE WEISSKOPF
SACRAMENTO PC USERS GROUP

Remembering Your Memory Configuration

DOS 5.0's MEM/C command, which generates a detailed memory-use report, can keep your finger on the pulse of your system. But the report flashes by too fast to read. The command MEM/C | MORE reports one screenful at a time. But you still can't go back to read a prior page. With Vernon Buerg's shareware *List* program, however, you can create this RAM.BAT file that lists your memory configuration in a scrollable format:

```
@ECHO OFF
MEM/C > C:\DOS\MEMORY.TXT
LIST C:\DOS\MEMORY.TXT
DEL C:\DOS\MEMORY.TXT
```

If you don't have *List*, it's available as LIST76B.ZIP from PC World Online. Or substitute the name of a word processor or text editor for 'List' in the third line. If you want a record of your memory configuration, omit the last line.

BOB MCDEARMID
ATLANTA PCUG

ANTHONY RUSSO

DON BAKER

Tape Tabs for 5¼-inch Floppies

The first thing I do when I buy a box of floppies is throw away the write-protect tabs. Why? Some tabs don't stick, and others leave a gooey residue. I make my own tabs with short lengths of 3M electrical tape, which most hardware stores carry. They're more pliable than paper tabs and stick fine, yet remove easily. And as long as you store your floppies in a cool, dry place, you won't get goo all over your disks.

WOODY KHOMAN
BANGKOK USER'S GROUP

Getting Rid of Modem Interference Automatically

If you spend a significant amount of time on line, you are probably familiar with the fact that when a phone call comes in via call waiting, it can kick off your connection at the drop of a download. You may also know that you can punch in *70 on a touch-tone telephone or that you can dial 1170 on a pulse-only instrument to cancel call waiting temporarily before dialing out. (Once you hang up, call waiting will be reinstated automatically.)

Instead of letting your fingers do the walking, why not arrange to have your communications program dial this string of numbers for you? Most communications programs today will allow you to incorporate the numbers directly into your dialing string. Follow those numbers with a few commas in order to insert a pause long enough for the dial tone to return before the program dials the phone number.

ROBERT SANDERS
ATLANTA PCUG

Starting with the November issue, User Group Tips *will have a new format, featuring tips from a single user group each month. Groups receive $200, 150 free copies of that month's issue, and the chance to attract new members. If your group would like to participate, write to* User Group Tips, PC World, *501 Second St. #600, San Francisco, CA 94107; or contact us electronically on PC World Online, User Group Tips; CompuServe, 74055,412; MCI Mail, PC World Editorial; or 415/442-1891 (fax).*

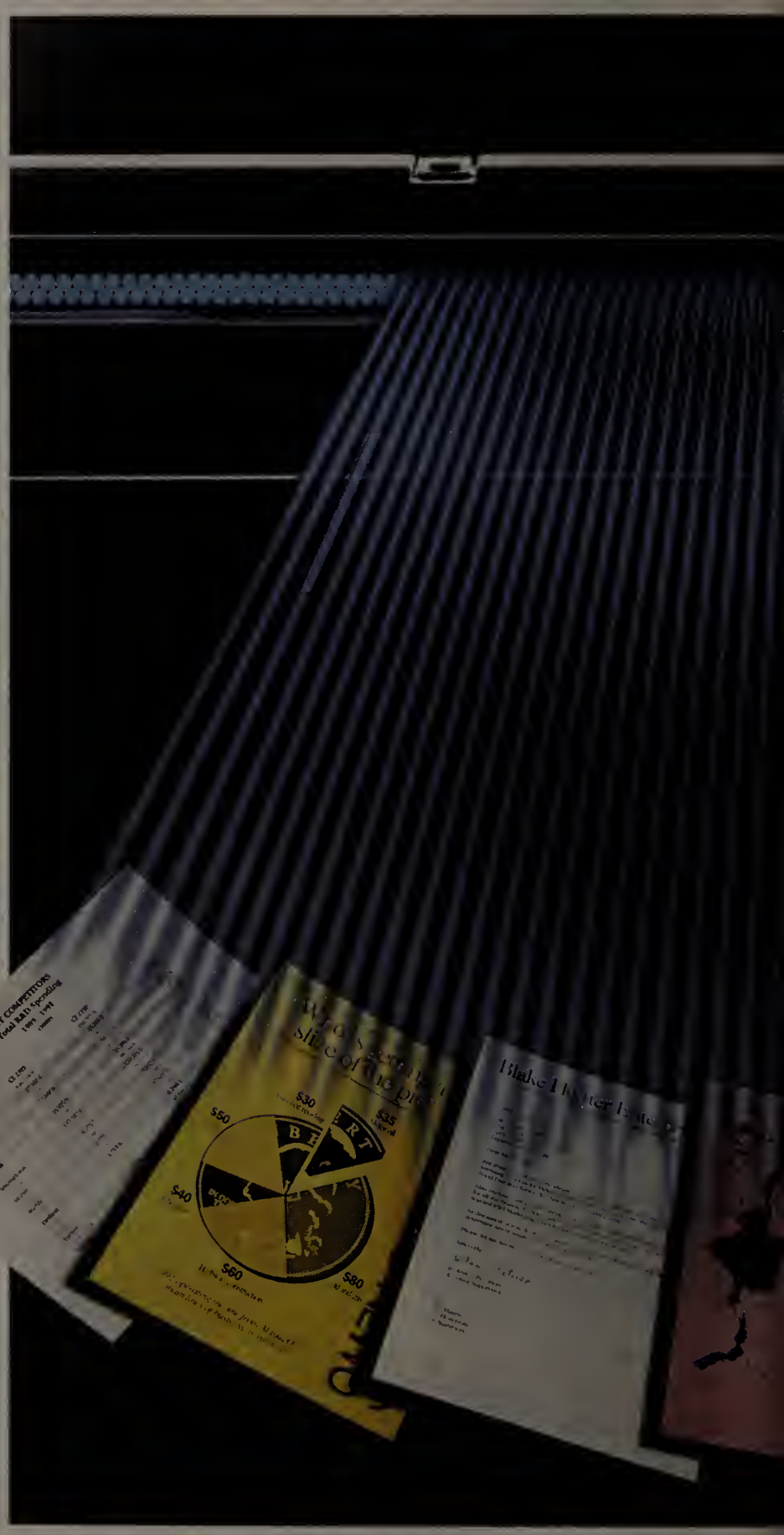
OKIDATA USES LIGHT TO MAKE YO

If you think all laser printers are mirror images of each other, meet the one that broke the mirror.

•

Okidata engineers flatly rejected the complex mechanism of rotating mirrors, focusing lenses and whirring motors that every major brand of laser printer depends on for its operation. Instead, they designed a better way – a unique, solid-state LED printhead that precisely positions each one of 2,560 pinpoints of light, to produce a laser printer's brilliant output without a laser printer's

OUR BRILLIANT LED PRINTER LINE-UP INCLUDES THE NEW, IMPROVED-RESOLUTION OKIDATA OL810.



Print samples created using popular software packages and printed on a range of Okidata LED Page Printers. *5 year limited warranty on LED printhead plus 1 year limited parts/labor on entire printer. OKIDATA and the OKI OK! are Reg.TMs of OKI Electric Industry, LTD. "It's got to be this good to be OKI OK!" is a TM of Oki America, Inc.

2,560 BURSTS OF U LOOK BRILLIANT

built-in complications.

•

Since our solid-state LED print-head has no moving parts, Okidata guarantees it for five full years–the industry's longest. (After all, our printers have a reputation of reliability to uphold.) And we offer a full range of machines that can handle any workload from basic word processing to sophisticated business text and graphics.*

•

To see how Okidata page printers can help make your business look brilliant, call 1(800) OKIDATA for the name of the dealer nearest you. And look brilliant yourself.

OKI OK!

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IT'S GOT TO BE THIS GOOD TO BE OKI OK!™

Circle 197 on reader service card

Half of work is concentration, the other half is brilliant support.

To help bring your best ideas to life, Philips introduces brilliantly designed tools that provide the kind of performance you'd expect from a leader in innovation.

Brilliant Performance

Philips offers a full line of state-of-the-art products, most with multi-frequency capability, digital image control, and low emissions circuitry. Display resolutions run up to 1600x1280. And most models offer Philips' exclusive FastRefresh™ capability, which redraws the on-screen image up to 160 times per second* to reduce fatigue caused by image flicker. This level of display performance is for demanding professional applications like CAD/ CAM, advanced graphics, and document preparation.

Multi Compatibility

The Philips line is the perfect match for Intel based and Macintosh computers, as well as most workstations. Thanks to our advanced digital control autoscan technology, these monitors adapt to a wide range of high-resolution graphic controller cards supporting scan rates as high as 82kHz.

The integrated front-panel LCD display provides information on product operation and sets a new standard for ease-of-use.

Complete Line of Full-Featured Monitors

Since one size never really fits all, Philips technology is available in 14", 15", 17", 20" and 21" screen sizes, with a model that's right for virtually every application.

Low Emission

Consistent with Philips' leadership position, our new monitors are equipped with VLF/ELF emission circuitry that meets or beats tough Swedish MPR-2 guidelines, and are built to perform for the long term, with 50,000 hour MTBF design reliability. Give your work the support it deserves - brilliant support from Philips.

* Actual refresh rate may be limited by video controller card or software.

Another First From Philips

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Circle 155 on reader service card

FAX SURVEY

OCTOBER 1992

WIN A HAND-HELD PC

Fax in your opinions to enter a drawing for a Gateway 2000 HandBook.

Which articles in *PC World* are valuable to you? Which aren't? Help us improve *PC World* by taking a few minutes to fill out the questionnaire below. Fax in your response and you'll have a chance to win the Gateway 2000 HandBook, a 2.7-pound mini-notebook previewed in our August issue.

HOW IT WORKS: Please read or look through the magazine as you normally would. (If you normally look through it several times, do the same this time.) Then photocopy this page and fill out the questionnaire, indicating which articles you read and how valuable their content was to you. Please also take a moment to tell us what you would like to see in future issues.

HOW TO ENTER: Fax your completed questionnaire, along with your name, address, and phone number, to *PC World* at 415/267-1779. Do NOT fax a cover page. If you don't have a fax machine, you can mail your survey to Fax Survey, *PC World*, 501 Second St. #600, San Francisco, CA 94107. Send your survey in no later than October 15; we'll notify the winner by the end of October.

PLEASE PRINT OR TYPE ALL INFORMATION

NAME

ADDRESS

CITY STATE ZIP

DAYTIME PHONE NUMBER

HOW TO FILL OUT THE FORM: PHOTOCOPY THIS PAGE; DO NOT TEAR IT OUT. Using black pen, fill the circles under the answers that apply to each article you read. Do NOT put an 'X' or a '✔' in the circles. First tell us whether you read the entire article or just some of it. If you didn't read it at all, leave the line blank. If you read the article, please rate its value to you on a scale from 1 (least valuable) to 5 (most valuable). WHEN FILLING THE CIRCLES, AVOID GOING OUTSIDE THE LINES! One entry per person.

	Did you read it?		Value to you?				
			Least				Most
	All	Some	1	2	3	4	5
Sample	◉	○	○	○	○	○	◉
In This Issue (page 13)	○	○	○	○	○	○	○
Letters (page 17)	○	○	○	○	○	○	○
Consumer Watch (page 31)	○	○	○	○	○	○	○
What Next? (page 49)	○	○	○	○	○	○	○
Top of the News (page 52)	○	○	○	○	○	○	○
New Bravos Deserve Applause (page 54)	○	○	○	○	○	○	○
Schedule+ for Windows (page 55)	○	○	○	○	○	○	○
Crosstalk for Windows 2.0 (page 56)	○	○	○	○	○	○	○
New Products (page 57)	○	○	○	○	○	○	○
Industry Outlook (page 95)	○	○	○	○	○	○	○
PC World Marketplace (page 104)	○	○	○	○	○	○	○
50-MHz 486DX2 Systems (page 108)	○	○	○	○	○	○	○
Point-and-Click Accounting Software (page 144)	○	○	○	○	○	○	○
Windows Alternatives (page 170)	○	○	○	○	○	○	○
The Less-Paper Office (page 186)	○	○	○	○	○	○	○
Work-Graup Printers (page 201)	○	○	○	○	○	○	○
CAD Software Under $1000 (page 213)	○	○	○	○	○	○	○
The Help Screen (page 223)	○	○	○	○	○	○	○
Spreadsheets (A..Z) (page 231)	○	○	○	○	○	○	○
Word Pracessing Clinic (page 245)	○	○	○	○	○	○	○
Data Basics (page 251)	○	○	○	○	○	○	○
Publishing & Presentatians (page 256)	○	○	○	○	○	○	○
Communications Q&A (page 263)	○	○	○	○	○	○	○
Windows Workshop (page 265)	○	○	○	○	○	○	○
User Graup Tips (page 271)	○	○	○	○	○	○	○
Star-Dat-Star (page 277)	○	○	○	○	○	○	○
Instant Reference Card: PC Tools (page 287)	○	○	○	○	○	○	○
The Home Office (page 326)	○	○	○	○	○	○	○
HOW WOULD YOU RATE THIS ISSUE OVERALL?			○	○	○	○	○

What would you like to see covered in future issues?

○ Alternative CPUs	○ Soundboards	○ OS/2 applications	○ Other (specify) _____
○ Processor upgrades	○ Windows applications	○ OCR software	_____
○ Scanners	○ DOS applications	○ CD ROM software	_____
○ CD ROM drives	○ OS/2	○ Desktop publishing	_____

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- 101-Key Keyboard
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- DOS 5.0

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- DOS 5.0

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- EISA Ethernet
- 101-Key Keyboard
- Tower Case
- DOS 5.0

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- ISA SCSI H.A.
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- 16-Bit Ethernet
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$3,295

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- 80486/50 ISA
- 16MB 60ns SIMM
- 256K Ext. Cache
- 4.5MB SCSI H.A.
- 340MB SCSI Drive
- 1.2 & 1.44MB Floppy
- 2 Serial, 1 Parallel
- Ultra VGA, 1MB
- 20" NI Color VGA
- 101-Key Keyboard
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STAR-DOT-STAR

EDITED BY BRETT GLASS

A global exchange of personal computer discoveries

Basic Backups

Backup programs come in handy when you need to back up an entire hard disk, but for daily, incremental backups, they're just a pain. When you have only 50K or 100K to back up, whatever speed advantage the programs have in the actual copying is lost in the time it takes to load them. Worse, some of them require a fresh floppy for every incremental, and that can leave you with a lot of floppies and only a few small files on each one.

So I wrote DAILYBAC.BAT [see **LISTING 1**], which uses the DOS XCOPY command, and DATEDIR.BAS [**LISTING 2**] to back up my incremental work onto floppies. The batch file makes a directory on your floppy named with the date, then copies all appropriate files into that directory and the subdirectories it creates within it. By copying files into date directories, you can have more than one backup on a single floppy. DAILYBAC requires DOS 5.0.

My batch file is set up for my hard disk; you'll want to change yours to match your hard disk's configuration. Because I keep my data files in subdirectories of C:\DATA, my batch file can use one XCOPY command to copy each file (*.*) in C:\DATA to the date directory (%TODAY%) in drive A:. The /S parameter tells XCOPY also to copy the files in every nonempty subdirectory of the directory named in the first parameter (C:\DATA). The /M tells it to copy a file only if it's been modified (has its archive bit set on), and to turn off the archive bit once the file is copied. The /V says verify that the copy is good. The /W says prompt me for a keystroke before copying begins. If you have more than one branch of files to back up, you can use additional XCOPY commands.

```
@ECHO OFF
CLS
ATTRIB -A C:\DATA\*.BAK /S
ATTRIB -A C:\DATA\*.TMP /S
ATTRIB -A C:\DATA\JUNK\*.* /S
ECHO Please make sure a disk is in Drive A:
QBASIC /RUN C:\UTIL\DATEDIR > TEMP.BAT
CALL TEMP.BAT
DEL TEMP.BAT
XCOPY C:\DATA\*.* A:\%TODAY%\ /S /M /V /W
ECHO ALL DONE
```

LISTING 1: DAILYBAC.BAT uses DOS's XCOPY to back up a day's work on a floppy.

Because I do not want to back up any files with BAK or TMP extensions or any files in C:\DATA\JUNK or its subdirectories, my batch file starts off with three ATTRIB commands that turn the archive bits off (-A) for all BAK and TMP files (*.BAK and *.TMP) in C:\DATA and its subdirectories (/S) and for all files (*.*) in C:\DATA\JUNK and its subdirectories (/S).

My example assumes that you will keep DATEDIR.BAS in your C:\UTIL directory. It does not matter which directory you keep it in, so long as the path to that directory is included in DAILYBAC's QBASIC command. You will want DAILYBAC.BAT and QBASIC.EXE (which comes with DOS 5.0) in directories in your AUTOEXEC.BAT's PATH statement.

When a floppy is full, you'll get an 'Insufficient disk space' message. Don't worry about it. Simply put in a floppy and start the batch file over. The second time around, XCOPY will ignore the files it's already backed up.

MARY KEATON
NEW YORK

Editor's note: This isn't the only situation in which it might be handy to set an environment variable from a BASIC program for use by a batch file. It's easy to adapt this technique so that the time of day, the day of the week, and so on are stored in the environment for easy access. One caveat: Make sure that you have enough environment space to allow the SET command to function. You might check out the tip "Two Ways to Save the Environment" in the

```
today$ = RIGHT$(DATE$, 2) + LEFT$(DATE$, 2) + MID$(DATE$, 4, 2)
PRINT "SET TODAY=" + today$
SYSTEM
```

LISTING 2: DAILYBAC.BAT (LISTING 1) uses this QBasic program, DATEDIR.BAS, to learn the date.

ANTHONY RUSSO

August Star-Dot-Star *if you discover that you are running out of environment space.*

Simple Security

To protect any file on your disk, first find its directory entry using the DISKEDIT program from *The Norton Utilities.* With the file name selected, press <F2> to view the directory listing as hex code, then <Tab> to move the cursor to the ASCII text on the right. From there, change any letter in the file name to lowercase. This protects your file from being opened, viewed, or copied by DOS or most other programs.

KANIVETS VLADIMIR
NEGIN, UKRAINE

*Editor's note: Like the old trick of adding <Alt>-255 to a file or directory name, this is a good way of securing a file. Unlike adding <Alt>-255, this technique allows you to keep all eight characters in your file name. However, it isn't foolproof; some commands that use wild cards (for example, DEL *.*) will work on the file. But it's plenty good enough to discourage casual but overly curious users. To work on the file yourself, go back into DISKEDIT and change the offending character back to uppercase.*

Leaving Windows in Suspense

I was disappointed to find out that my TI TravelMate 2000's suspend/resume mode, like that on many other laptops, doesn't work inside *Windows.* Luckily, after some experimentation, I discovered an exception: It *does* work from inside a *Windows* DOS session.

To give myself instant access to the suspend/resume feature, I used the Windows Recorder to create a hot key macro that starts a DOS session. When I want to put the computer to sleep, I press a hot key (<Ctrl>-<Alt>-D), then the Suspend key. To return to work, I simply hit resume and type EXIT at the DOS prompt. The macro is also handy for launching a quick DOS session on *any* machine.

Here's how to create the macro. Open Recorder from Program Manager's

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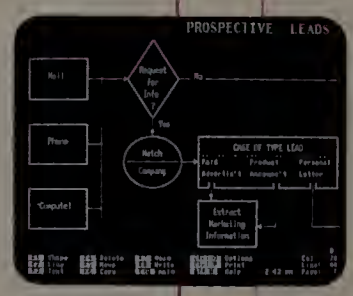

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POWER TIP NO. 264

Dropping the dBASE Star

Many *dBASE III Plus* or *dBASE IV* users type DIR *.PRG to get a listing of PRG files in the current directory. What many people don't realize is that the asterisk is unnecessary; **DIR.PRG** yields the same results.

Iftikhar Ahmed Khan
Karachi, Pakistan

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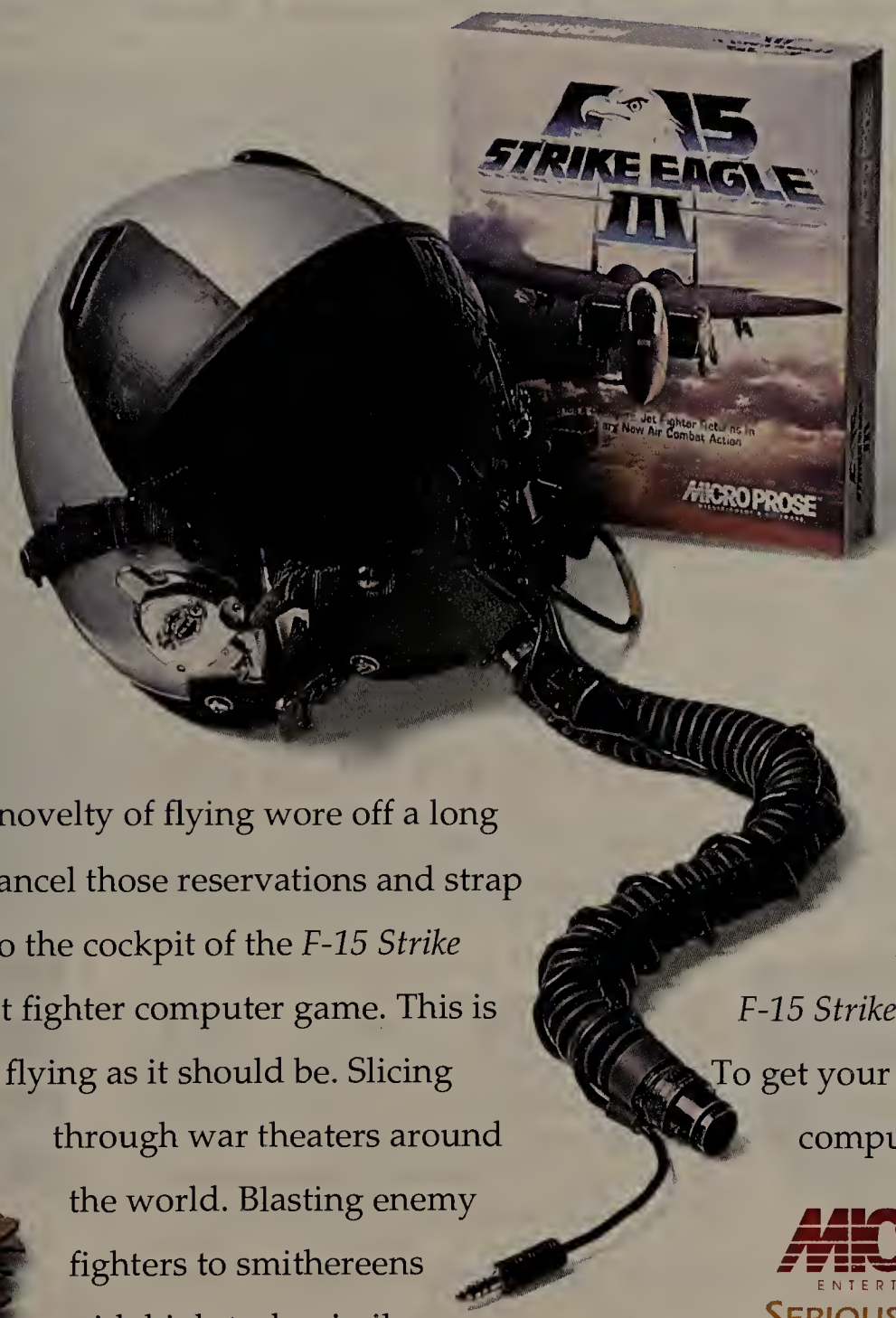

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Accessories group. If you already have your own file of macros, use the *File•Open* command to open it now. Select *Macro•Record* to bring up the Record Macro dialog box. In that box, name the macro **Start a DOS session**, set your Shortcut Key to **<Ctrl>-<Alt>-D**, make sure that the Playback To setting is for Same Application, and select *Ignore Mouse* from the Record Mouse list box. Once you've set your options, select *Start* to start recording.

Because you were in the Program Manager when you launched Recorder, you should be back there now. Using the keyboard, (you told Recorder to ignore the mouse), press **<Alt>-FR** (for File Run). Type **COMMAND** in the resulting dialog box, and press **<Enter>**. When the DOS prompt appears, type **EXIT** and press **<Enter>** to return to *Windows* (the keys you press at the DOS prompt aren't recorded). Finally, press **<Ctrl>-<Break>** to stop recording the macro and **<Alt>-S-<Enter>** to save it to Recorder. Press **<Alt>-<Tab>** to return to Recorder, then save the macro to a file with *File•Save*, naming it as you wish.

Finally, to make sure your macro is ready to run at any time, you'll need to configure *Windows* to start Recorder—and your macro file—at the beginning of each session (Recorder uses only 30K of memory, so don't worry about having insufficient room for other applications). To do this configuring, use Sysedit or a text editor to add the name of your macro file to the Load= line in your WIN.INI file.

TIM ROHRER
TUCSON, ARIZONA

Editor's note: This is a great workaround for a Windows *conflict that plagues many notebook users. Unlike a Program Manager icon's shortcut key, which works only when Program Manager is the active window, Mr. Rohrer's macro works from any window except a 386 Enhanced Mode DOS session. This makes the macro much more convenient than a Program Manager shortcut key.*

Copy Alert

MS-DOS's DISKCOPY command uses only conventional memory, which means that copying high-density disks requires many disk swaps. Even worse, DISKCOPY doesn't make a sound when it prompts you to change disks. To avoid having to watch the screen constantly, I made a small change in DISKCOPY that causes it to beep when disks must be changed.

The change is very simple. Make a copy of your DISKCOPY.COM file and load it into a hexadecimal editor such as Central Point's *PC Tools* or *The Norton Utilities*. Next, use the editor's find or search command to find the word *insert*, which should bring you to the message about inserting a disk. Depending on your DOS version, you may find

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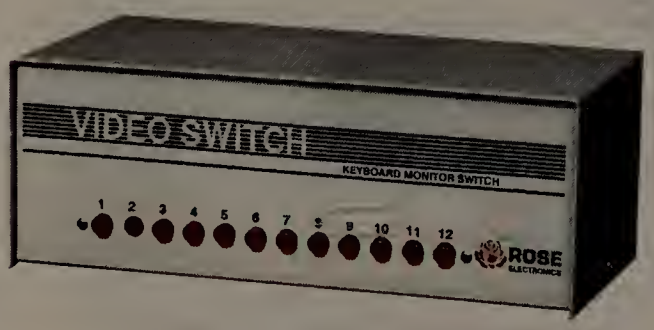

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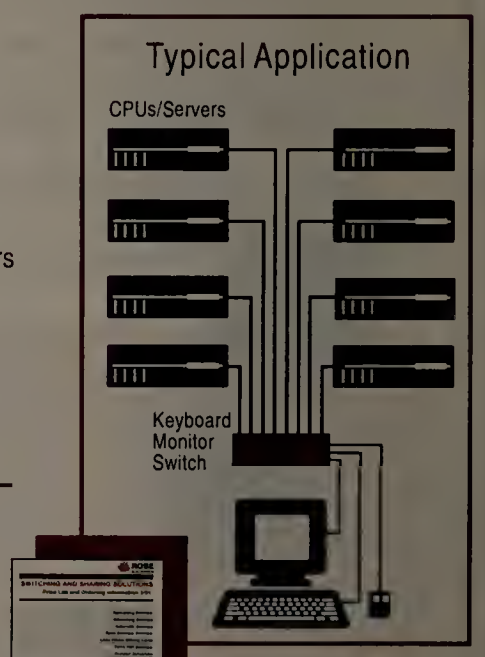

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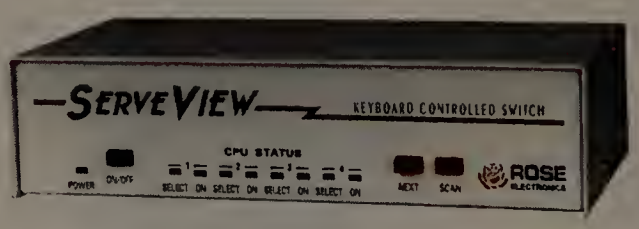

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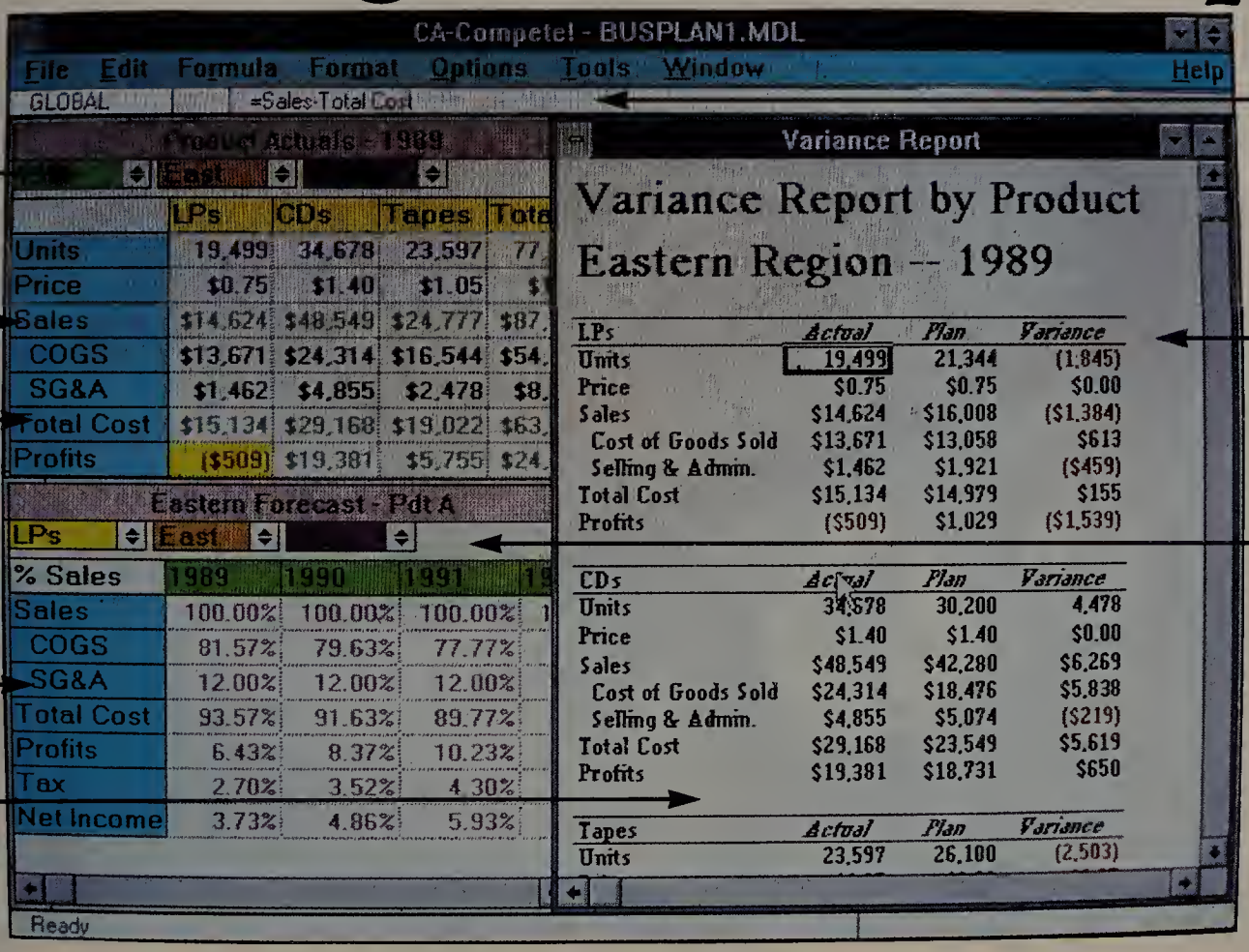

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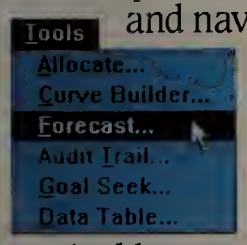

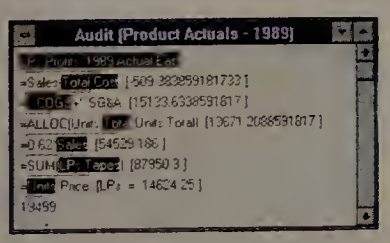

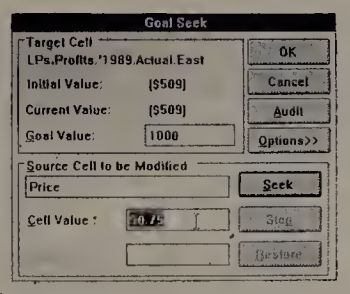

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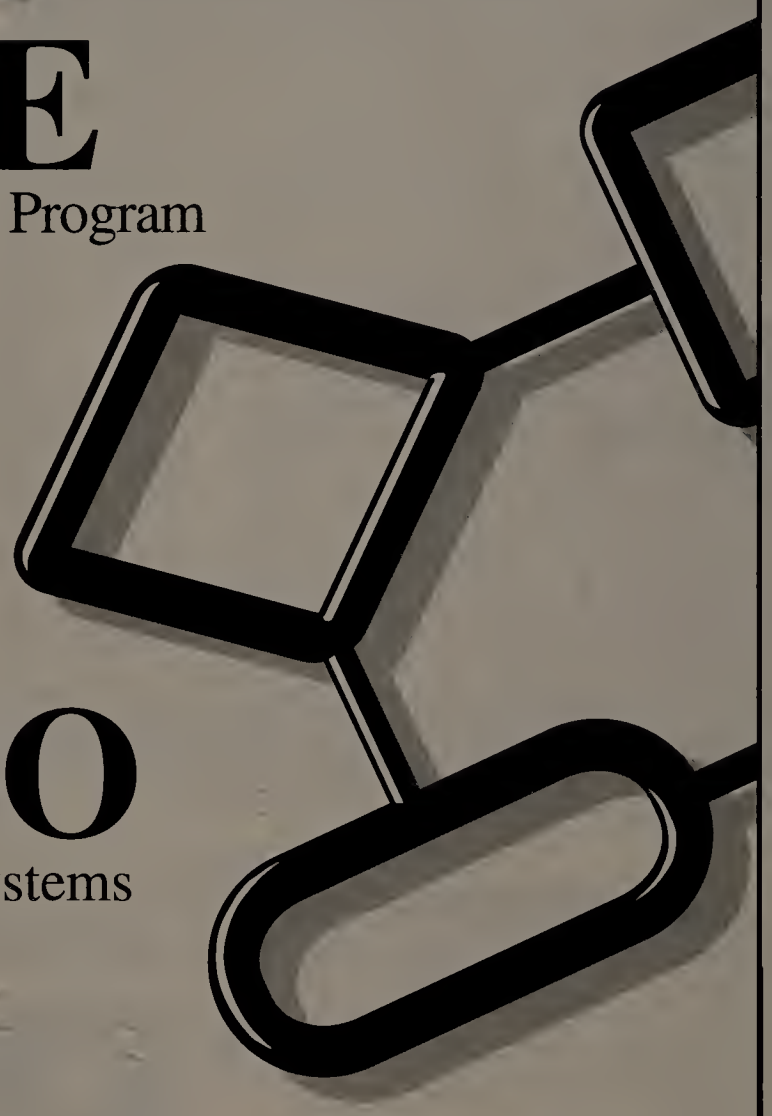

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two separate strings for the source and target disks or only one string containing the characters *%s* (the C language's shorthand for a string that can change depending on the situation).

At the end of the string(s), you'll find a carriage return (code 0D hex) and a linefeed (0A hex). Replace each of these characters with the hex code **07** (the "bell") character. Repeat the procedure for the other string (if necessary), and remember to update the file before leaving the editor.

Overwriting the carriage return and linefeed has another advantage: The messages 'Insert the Source diskette in drive X:' and 'Press any key when ready' now come on consecutive lines, so that all the messages associated with one copy operation fit on a single screen.

JEAN-LOUIS LONGUEVILLE
NAMUR, BELGIUM

Editor's note: This technique will help you get your disks copied faster—unless you enjoy staring raptly at your PC during the entire operation. But if you are making a substantial number of copies, you might consider one of the many shareware and freeware utilities that save an image of a floppy disk to your hard drive and can reproduce the disk on demand.

WordPerfect Quick Save Revisited

I wrote a variation of Bruce Purcell's *WordPerfect 5.1* save macro, shown in June's *Star-Dot-Star*, that avoids the unneeded error message. Like his, mine prompts you for a file name if you haven't saved the document and otherwise saves it without prompting. The key to avoiding the error message is to test the Name system variable, which contains the file name, to determine if the document has already been saved.

ROBERT J. SANDLER
NEW MILFORD, NEW JERSEY

Editor's note: Mr. Sandler's macro was the first of nearly 100 responses suggesting improvements to the original. Most of the submissions took the same

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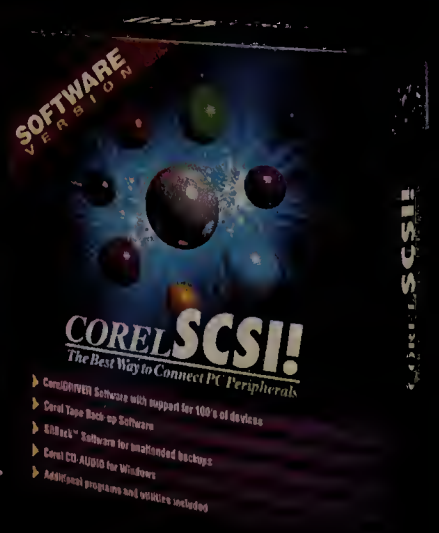

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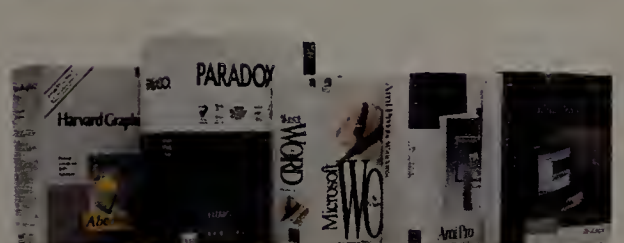

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```
{IF}"{SYSTEM}Name~""=""~
   {Save}
{ELSE}
   {Save}{Enter}y
{END IF}
```

LISTING 3: Here's one way to improve on June's WordPerfect Quick Save macro.

approach as the one in **LISTING 3***—they used {SYSTEM}Name to determine if the file needed a name.*

None, however, offered a clean solution to a different problem pointed out by some readers: When WordPerfect *was set to use long document names, the macro would fail (the prompts from the Save command are different when you use long names). After querying several of WordPerfect's tech support experts, I was able to write a macro that checked for long file names by bringing up a file list that's hidden by a {DISPLAY OFF} command. My macro, shown in* **LISTING 4***, is slower than Mr. Sandler's and won't work with* WordPerfect 5.1 *revisions dated earlier than 6/29/90, but if you sometimes use long file names, you'll find it useful.*

Since both macros use macro-specific commands, you can't create either of them simply by recording keystrokes; you must use the macro editor. To get to this editor, press **<Home>**, *then* **<Ctrl>-<F10>**. *At the Define Macro prompt, press* **<Alt>-S** *(assuming that's your desired hot key) and press* **<Enter>**; *at the Description prompt, type* **Save and continue**, *and press* **<Enter>** *again. You're now ready to create the macro.*

Entering commands and controls into a WordPerfect *macro isn't a simple matter of typing the labels. To insert the {Enter} and {Exit} controls, press* **<Ctrl>-V** *followed by the key (*<Enter> *and* **<F7>**, *respectively). To enter the {IF}, {ENDIF}, {SYSTEM}, {ASSIGN}, {TEXT}, and {VARIABLE} commands, press* **<Ctrl>-<Page Up>**, *select the command on the resulting pop-up list, and press* **<Enter>**. *Insert {Save} by pressing* **<F10>** *and {List} by pressing* **<F5>**. *Type the nonbracketed text as it appears. Use* **<Tab>** *rather than <Space> to indent lines. When the macro is finished, press* **<F7>** *to exit the macro editor.*

Note to our Readers

Starting next month, look for *Star-Dot-Star* under its new name, *Dialog Box.*

Have a macro, batch file, short program, or general tip you're proud of? Mail your tips to Dialog Box, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Dialog Box; CompuServe, 74055,412; MCI Mail, PC World Editorial; Internet, rogue@well.sf.ca.us; or 415/442-1891 (fax).* PC World *pays $25 to $200 for each tip used. Sorry, we cannot acknowledge unpublished materials.*

Brett Glass is a contributing editor for PC World.

```
{IF}"{SYSTEM}Name~""=""~
   {Save}
{ELSE}
   {DISPLAY OFF}
   {List}{Enter}{ASSIGN}Long~{SYSTEM}Entry~~{Exit}
   {Save}{Enter}
   {IF}"{VARIABLE}Long~""="."~
      {Enter}{Enter}
   {END IF}
   y
{END IF}
```

LISTING 4: This WordPerfect Quick Save macro will save your file without questions, whether or not you use long file names.

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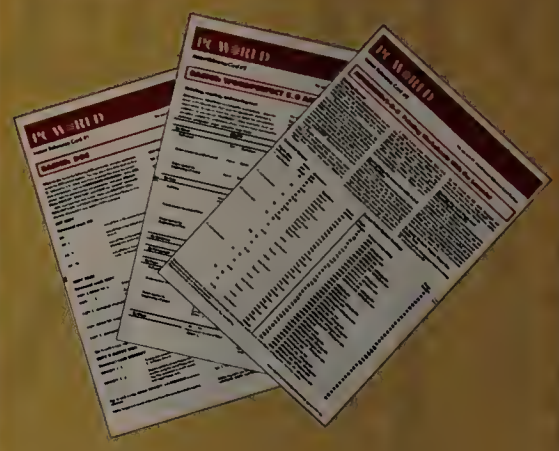

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PC TOOLS 7.1: PC SHELL

PC Shell can launch programs and other *PC Tools* utilities as well as manage files, directories, and disks. At the top of its default display are its title and menu bars. (To open a menu, click it with the mouse or hold down **<Alt>** and press the menu name's first letter.) Just below is the Drive Line (icons of your drives, with the active one highlighted). Next are two windows, the Tree List (the active drive's directory structure, with the active directory highlighted) and the File List (the active directory's files, with the active file highlighted). The last two lines hold the DOS Command Line (if activated) and the function key definitions for the current task. To activate another Line or List, click it or press **<Tab>** or **<Shift>-<Tab>** until it's highlighted.

MANAGING FILES

Change active List's drive	**<Ctrl>-***drive letter;* or click drive icon
Select/unselect file(s) in active File List	Cursor to name, **<Enter>**; or click mouse on file name. Repeat for more
Select directory/file using Speed Search	Activate Tree/File List, begin typing name, **<Enter>** when name is highlighted
Unselect all files in active List	**<F4>**
View selected (or highlighted) file(s) in active List	**<F2>** or **F**ile•**V**iew File Contents, **<F10>**/**<F9>** to view next/previous file, **<F3>** or **<Esc>** to quit
Edit selected (or highlighted) file(s) in active List	**F**ile•Cha**n**ge File•**E**dit File•**E**dit, **<F2>** to save, **<F3>** or **<Esc>** to quit
Rename selected (or highlighted) file(s) in active List	**F**ile•Re**n**ame, type new file name, **<Enter>**, type file extension, **<Enter>** **R**ename
Display dual (two sets of) Tree and File Lists	Activate Tree List/File List/Drive Line, **<Insert>**; or **V**iew•**D**ual File Lists
Display single Tree and File List	Activate Tree List/File List/Drive Line, **<Delete>**; or **V**iew•**S**ingle File List
Copy file(s)	Display dual Tree and File Lists, select destination drive and directory in one, select file(s) to copy in the other. **<F5>** or **F**ile•**C**opy•**O**K; or drag selected file(s) to other File List
Move file(s)	Display dual Tree and File Lists, select destination drive and directory in one, select file(s) to move in the other. **F**ile•**M**ove•**O**K•**O**K; or **<Ctrl>**-drag selected file(s) to other File List
Find file(s) in active drive by name and/or date, size and/or other attribute(s)	**<F7>** or **F**ile•**L**ocate. Type file specification and/or text string; or Fi**l**ters, specify file criteria, **O**K. **S**tart
Change active File List's sort order and/or display options	**<F6>** or **O**ptions•**F**ile Display Options, select sort and/or display options, **O**K
Move active window	**<Alt>-<Space>**•**M**ove, use cursor keys, **<Enter>**/**<Esc>**/**<F3>**; or drag title bar
Size active window	**<Alt>-<Space>**•**S**ize, use cursor keys, **<Enter>**; or drag resize box (lower right corner of window)
Expand one level of active directory tree	Highlight directory, **+** or **T**ree•**E**xpand One Level; or click folder icon containing +
Expand entire branch of active directory tree	Highlight directory, * or **T**ree•Expand **B**ranch
Collapse branch of active directory tree	Highlight directory, – or **T**ree•**C**ollapse Branch; or click folder icon containing –
Display DOS Command Line	**V**iew•**C**ustom List Configure•**D**OS Command Line
Delete active List's selected (or highlighted) file(s)	**F**ile•**D**elete•**D**elete or Delete **A**ll

MANAGING FILES (continued)

Undelete file(s)	**F**ile•**U**ndelete, select drive if necessary, select file(s), **<F8>** or **F**ile•**U**ndelete, type first letter of file name, **O**K

Tip: To increase your chances of undeleting files successfully, avoid saving or copying other files to your hard disk beforehand.

MANAGING DIRECTORIES

Create directory	**D**isk•Directory **M**aintenance•**A**dd a directory
Rename/remove directory	**D**isk•Directory **M**aintenance•**R**ename a directory/**D**elete a directory
Move directory and its subdirectories	**D**isk•Directory **M**aintenance•**P**rune and graft, select top directory in branch to move, **O**K, select directory to attach branch to, **O**K
Sort directory's file names	**D**isk•Sor**t** Files in Directory, choose sort field and method, **S**ort•**U**pdate

MANAGING DISKS

Make exact duplicate of floppy disk	**D**isk•**C**opy, select source and target drives. Insert source floppy, **O**K, insert target floppy, **O**K; repeat as necessary until done
Ensure accuracy of duplicate floppy disk	**D**isk•**C**ompare, select source and target drives. Insert source floppy, **O**K, insert target floppy, **O**K; repeat as necessary until done
Format disk	**D**isk•**F**ormat Data Disk, select drive, **O**K, select options, insert disk if necessary, **O**K, **O**K if asked to confirm deletion of existing files, **C**ancel•**E**xit•**O**K
Format bootable floppy disk	**D**isk•Make Disk **B**ootable, select drive and format options, insert floppy, **O**K, **E**xit
Display disk information	Select drive, **D**isk•Disk **I**nformation•**O**K
Verify readable disk	Select drive, **D**isk•**V**erify•**V**erify•**C**ancel

Note: If you've installed a *PC Tools* utility to back up, defrag, unformat, low-level format, or perform disk repair and maintenance, you can press **<F10>**, select PC Tools, and choose the utility to run it.

MANAGING PROGRAMS

Launch program from File List	Select program file, **<Ctrl>-<Enter>** or double-click file name, type parameters if necessary, **O**pen
Enter Program List Only mode	**V**iew•**P**rogram List Only; or **<F10>**
Associate/exclude data files with/from Program List program	Activate Program List, highlight program, **<F5>**•**A**dvanced, go to File Associations field, type file names and/or wild-card masks separated by a space (precede with **–** to exclude)
Launch program from Program List group	Activate Program List, open group if not Main Menu. Highlight program, **<Enter>**; or double-click program name
Display/hide Program List Description panel	Enter Program List Only mode, **<F2>**
Add program/group to Program List group	Activate Program List, open group to be added to (if not Main Menu), **<F4>** or **F**ile•**N**ew, **I**tem/**G**roup, type title, type command if item. Optionally, set start-up directory, password, description, or advanced options

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PC TOOLS 7.1: DESKTOP MANAGER

You can access Desktop Manager from PC Shell by pressing and then selecting **<F10>** PC Tools • **D**esktop Manager. If you load Desktop Manager as a terminate-and-stay-resident (TSR) program (**DESKTOP /R** at the DOS prompt or in AUTOEXEC.BAT), you can access it from within other programs with **<Ctrl>-<Space>**. Desktop Manager must run as a TSR for Scheduler to alert you of appointments.

MANAGING TIME

Open Appointment Scheduler	**D**esktop • **A**ppointment Scheduler
Create new file	Open Scheduler, type new name, **<Enter>** **O**K
Load existing file	Open Scheduler; type, select, or double-click name
Record appointment in currently loaded file	Select day, select time in Daily Scheduler window, type description, **<Enter>**, set options, **M**ake
Set alarm or attach note for appointment	Select description, click again or **<Enter>**, **E**dit • **S**ettings, set alarm or check Attach note, **O**K • **M**ake
Delete appointment	Select description, click again or **<Enter>**, **D**elete
Delete all old appointments	**C**ontrols • **D**elete Old Entries, type or accept cutoff date, **D**elete
Display 5-day time usage	Select first day, **<F8>**; **<F8>** to close
Add to-do list item	Select day, activate To-Do List window, type description, **<Enter>**, set options, **M**ake

MANAGING PEOPLE AND THINGS

Open Databases	**D**esktop • **D**atabases
Create new file	Open Databases, type new name, **<Enter>** • **O**K
Load existing file	Open Databases; type, select, or double-click name
Create sample address book data base file	Create new file. Type **first name** for Field Name, set Size (maximum number of characters allowed in field), **A**dd; repeat to name, size, and add **last name**, **street**, **city**, **state**, **ZIP**, and **phone** fields; **S**ave
Add data to file	Load file, **F**ile, **M**odify Data if not preceded by check mark, **E**dit • **A**dd New Record, enter data
Search for first record with data that matches criteria text	**S**earch • **F**ind Text in All Fields, type criteria text in Search Data box, select Search selected records, **S**earch; **<F7>** • **S**earch to find other occurrences
Sort file by field	**E**dit • **S**ort Database, **N**ext until field appears, **S**ort
Delete record	Select record, **F**ile, **M**odify Data if not preceded by check mark, **E**dit • **D**elete Record
Undelete records	**E**dit • **U**ndelete Records
Purge deleted records	**E**dit • **P**ack Database, **O**K

Note: Purging deleted records saves disk space. The maximum number of records, active plus deleted, is 10,000.

MANAGING IDEAS

Open Outlines	**D**esktop • **O**utlines
Create new file	Open Outlines, type new name, **<Enter>** • **O**K, type first line, **<Enter>**; **<Tab>** before typing or at beginning of line to demote line, **<Backspace>** before typing or at beginning of line to promote line
Load existing file	Open Outlines; type, select, or double-click name
Promote/demote level and its sublevels	Place cursor anywhere on line, **H**eadlines • **P**romote/**D**emote
Collapse to headlines	**H**eadlines • **M**ain Headline Only

MANAGING IDEAS (continued)

Show all levels	**H**eadlines • Expand **A**ll

Tip: When cutting and pasting to rearrange outline, make sure all levels of outline are visible. The cut command works only on visible headings.

MANAGING TEXT

Open Notepads	**D**esktop • **N**otepads
Create new file	Open Notepads, type new name, **<Enter>** • **O**K
Load existing file	Open Notepads; type, select, or double-click name
Copy/move text block	**E**dit • **M**ark, place cursor at beginning of block, use **<Shift>**-cursor key or drag mouse pointer to highlight text, **E**dit • **C**opy to Clipboard/Cu**t** to Clipboard, place cursor at insertion point, **E**dit • **P**aste from Clipboard
Find text beyond cursor	**<F6>**, type text, **F**ind; **<F7>** to find again
Find and replace text beyond cursor	**<F6>**, type text, type replacement, select Verify before replace or Replace all, **R**eplace; **<Enter>** to replace or **<Space>** to skip current selection
Check spelling of word	Place cursor in or just after word, **E**dit • Spellcheck **W**ord; if word is not recognized, **C**orrect, select one of suggested words, **A**ccept
Check spelling of file	**<F8>**; if misspelled word is found, **C**orrect, select one of suggested words, **A**ccept
Add to spelling checker	When spelling checker flags word, **A**dd

Note: Before adding a word to the spelling dictionary, make sure it's spelled correctly. Once added, it can't be modified or deleted.

MANAGING COMMUNICATIONS

Open Modem Telecommunications	**D**esktop • **T**elecommunications • **M**odem Telecommunications
Configure modem	**S**etup • **M**odem setup, set options, **O**K
Add entry to phone directory	**E**dit • **C**reate new entry, type name, enter phone number and other options, optionally **N**ext Screen to change telecommunications defaults, **O**K
Dial modem	Select directory entry, **<F7>** or **<Enter>**; or double-click entry. **<F8>** to dial manually
Open Electronic Mail	**D**esktop • **T**elecommunications • **E**lectronic Mail
Select E-mail service	**S**etup • **M**ail Service, select service, Co**n**figure, set options, **O**K
Create and send E-mail message	**<F8>** or **A**ctions • **C**reate mail message, type mail address and message, **F**ile • Send **E**lectronic Mail, select send option, **O**K
Open Fax Telecommunications	**D**esktop • **T**elecommunications • **S**end a Fax
Add entry to fax directory	**<F4>** or **A**ctions • **A**dd a new entry, type name, enter fax number and other options, **M**ake a new File and Send, type file name, **O**K, type note's text, **O**K
Send fax to name in directory	Select name, **<F7>** or **<Enter>**; or double-click entry. **S**elect Files and Send. Type or select file name, **A**dd; repeat for more. **S**end • **S**end

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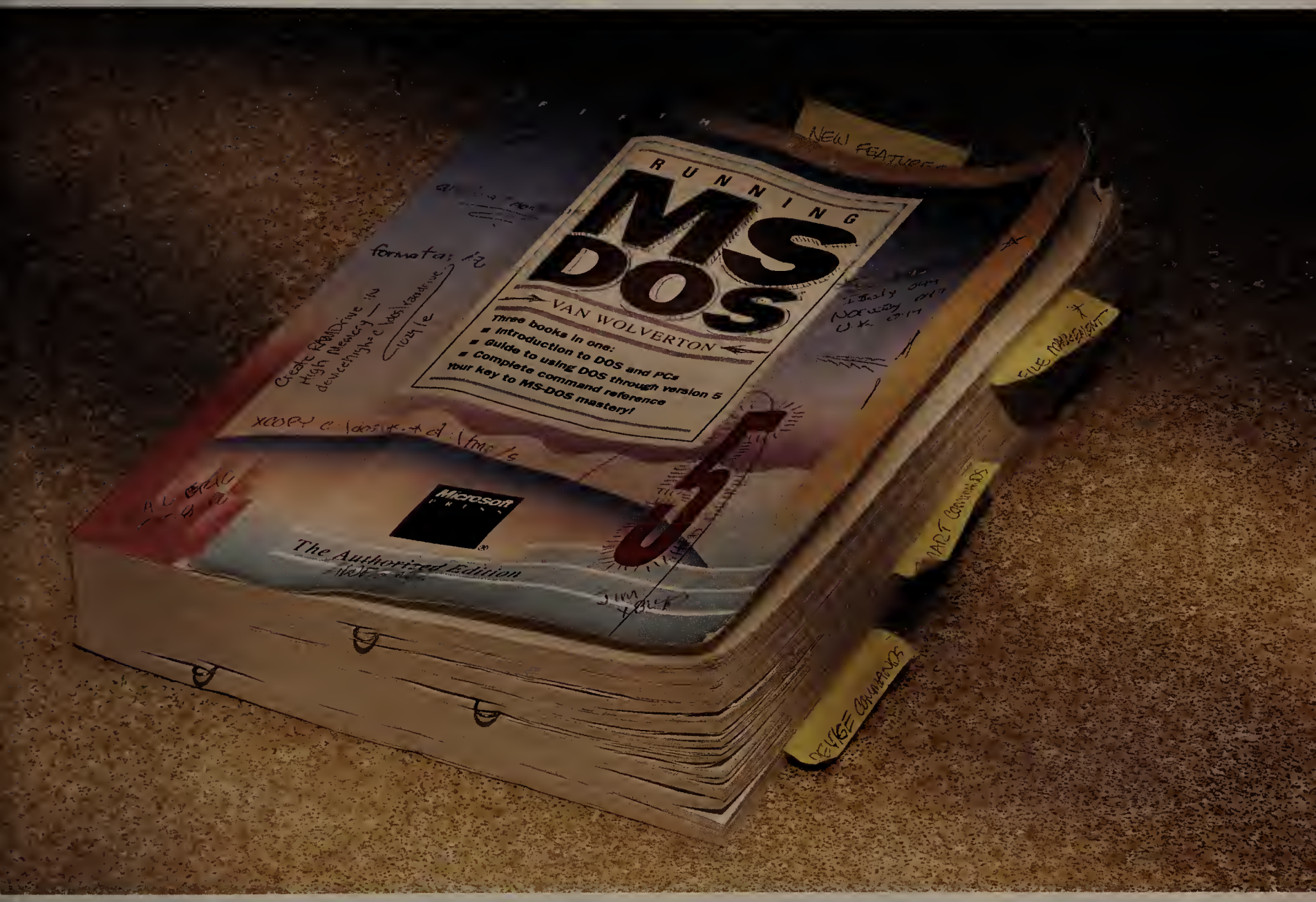

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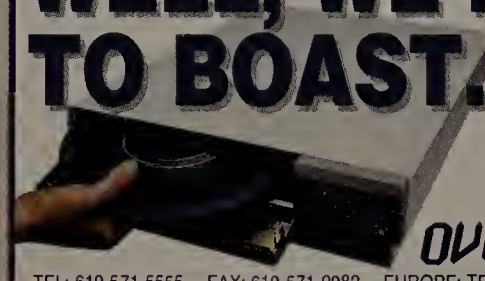

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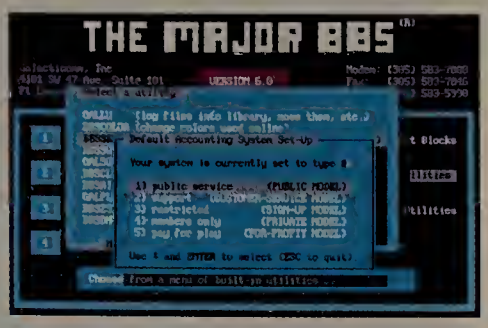

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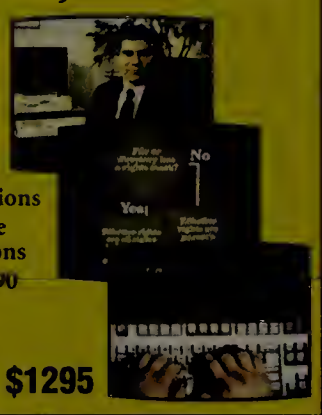

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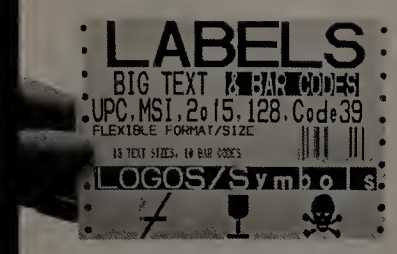

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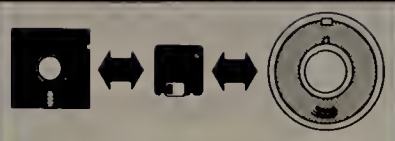

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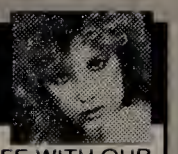

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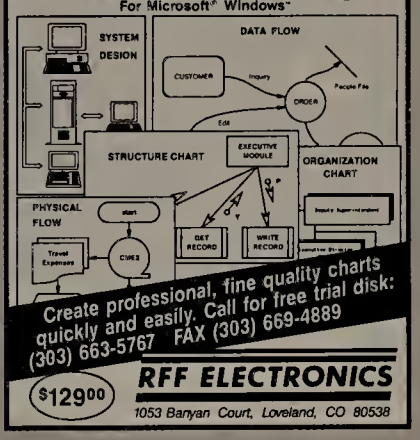

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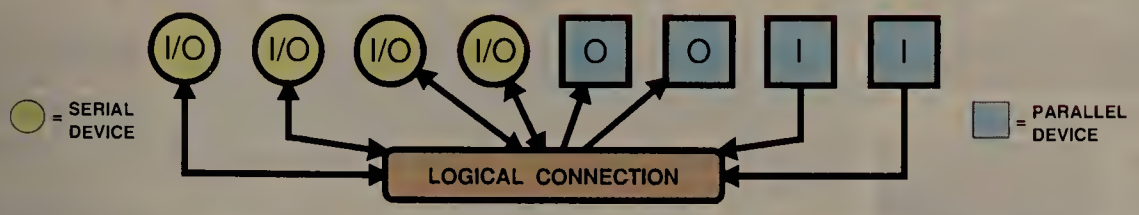

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14" SVGA 1024x768 0.28mm Color - NI	329
17" SVGA 1024x768 0.31mm Color - NI	779
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Magitonic	
14" Paper White Monochrome	109
14" SVGA 1024x768 0.28mm Color	279
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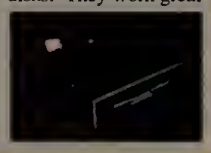

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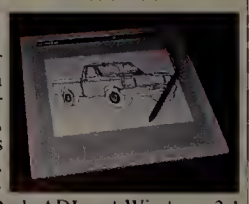

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Microsoft
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- Serial with Windows 147

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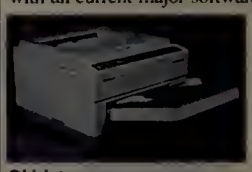

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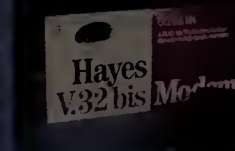

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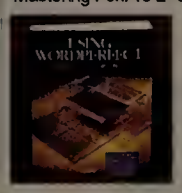

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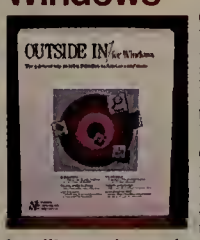

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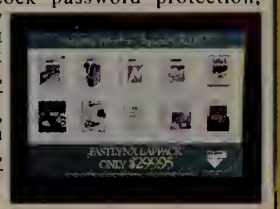

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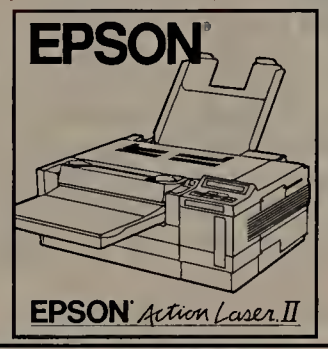

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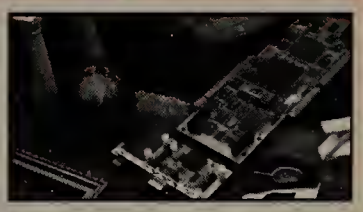

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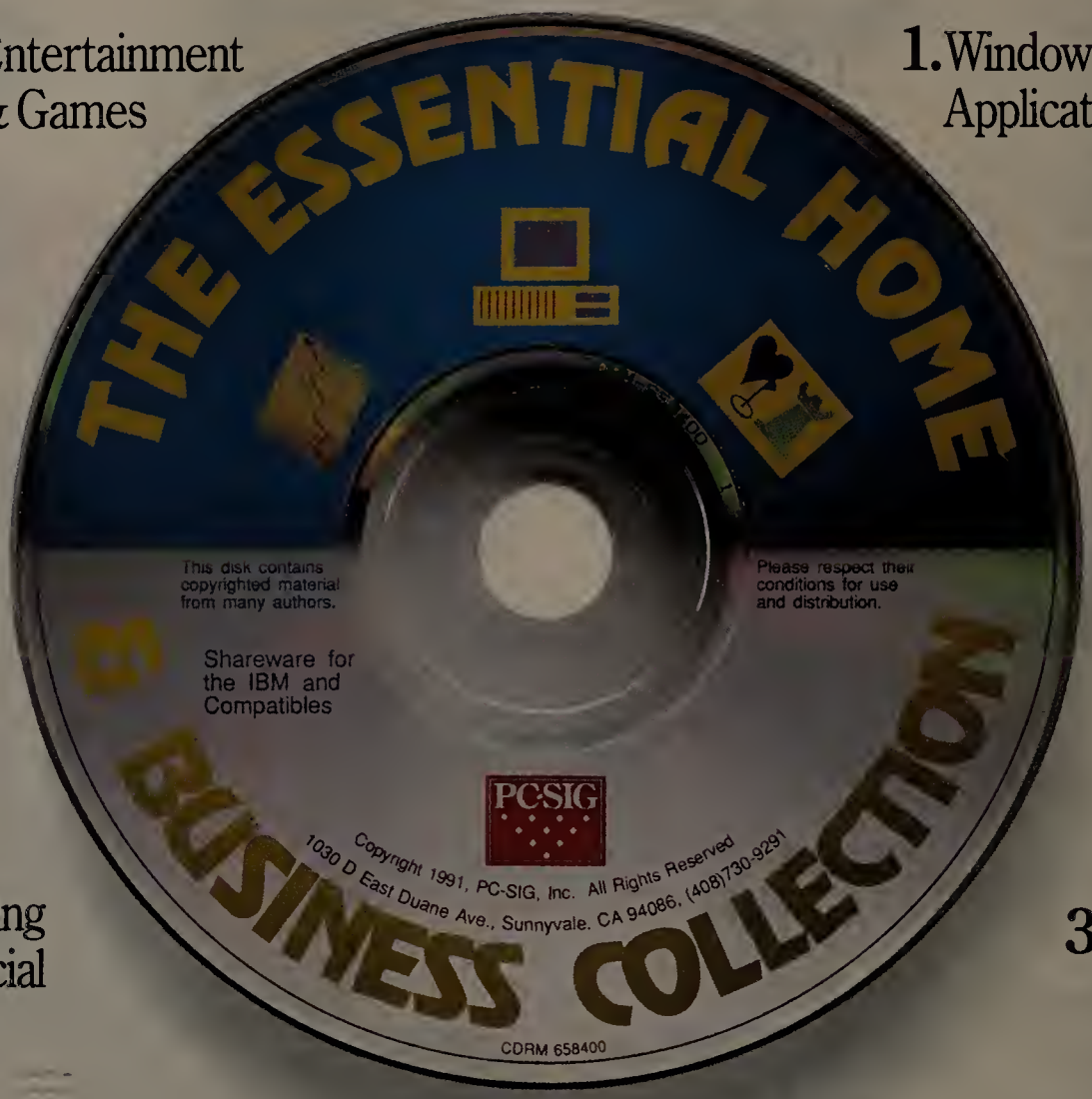

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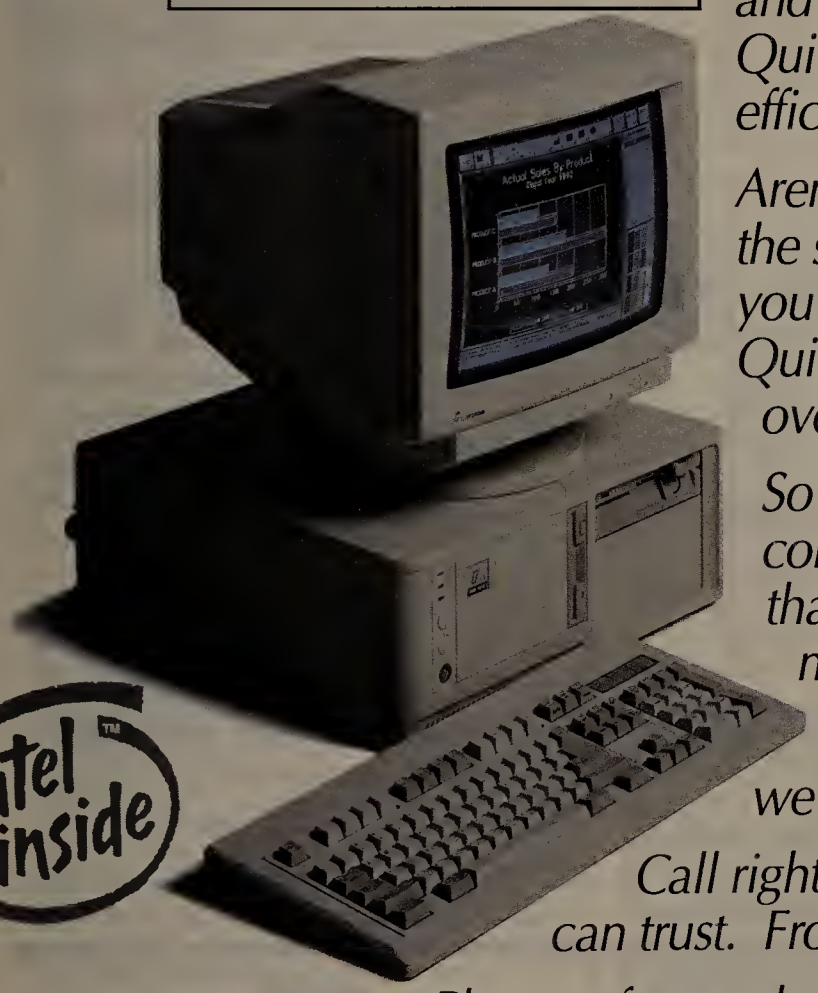

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6450379 (2Meg)	80-111, 311-121, 321, 081, 161	109.00
6451060 (4Meg)	80-A21, A-61, 80-A31, 80-111, 80-311	199.00
6450603 (1Meg)	35SX, 40SX, 55SX, Model-70's, P-70	49.00
6450604 (2Meg)	70-061, E61, 121, 50Z, 55SX, 65SX, P-70, 55LS, 65LS, X-Station 120 & 130, 35SX, 35LS, 40SX	79.00
6450608 (2Meg)	70-A21,A-61, B-21, 8-61, 35SX,35LS, 40SX	84.00
78X8955 (128K)	25	35.00
34F2933 (4Meg)	35SX, 40SX, 55SX, 65SX, 55LS, 65LS	149.00
87F9977 (4Meg)	55SX, 55LS, 65SX, 40SX, 35SX, 35LS	149.00
1057035 (512K)	P/S1	40.00
92F9935 (2Meg)	P/S1 & P/S1/386SX	79.00
92F9694 (4Meg)	P/S1 & P/S1/386SX	149.00
6450902 (2Meg)	57SX,90, 95, P-75, 57SLC	94.00
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COMPAQ MEMORY MODULES

MODEL#	AMT. UPGRADED	CMPQ PART#	PRICE
DeskPro 386/33, 386/33L, 486/25, 486/33L, 486/50L, System Pro	2Meg Module	115144-001	104.00
	8Meg Module	116561-001	299.00
	32Meg Module	116568-001	1700.00
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	4Meg Module	113132-001	169.00
DeskPro 386S-16MHz	1Meg Exp Bd	113633-001	110.00
	4Meg Exp Bd	113634-001	219.00
	1Meg Module	113646-001	75.00
	4Meg Module	112534-001	169.00
DeskPro 386/20E	1Meg Exp Bd	113644-001	119.00
DeskPro 386/25E	4Meg Exp Bd	113645-001	219.00
	1Meg Module	113131-001	75.00
	4Meg Module	113132-001	169.00
DeskPro 286N, 386N, 386SX/20, 386/25M, 486/33M, 486S/25M, 486S/16M	1Meg Module	118688-001	50.00
	2Meg Module	118689-001	85.00
	4Meg Module	118690-001	159.00
DeskPro 386/16	1Meg Kit	108071-001	99.00
	4Meg Kit	108072-001	269.00
	1-2Meg Exp 8d	108069-001	249.00
	4-8Meg Exp 8d	108070-001	479.00
DeskPro 286	512K Kit	113012-001	79.00

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Portable 386	1Meg Kit	107651-001	129.00
	4Meg Exp Bd	107653-001	449.00
	4Meg Daght. 8d	107654-001	449.00
Portable III	2Meg Kit	107332-001	99.00
Compaq SLT/286	1Meg Module	110235-001	99.00
	4Meg Module	110237-001	299.00
Compaq SLT/386	1Meg Module	118303-001	89.00
	2Meg Module	118304-001	129.00
	4Meg Module	118305-001	199.00
Compaq Lte 286	1Meg Bd	117081-001	79.00
	2Meg Bd	117081-002	99.00
	4Meg Bd	117081-003	219.00
Compaq Lte 386S/20	1Meg Module	121125-001	99.00
Compaq Lte 386S/20	4Meg Module	121125-002	219.00
Compaq Lte Lite/20, 25	2Meg Module	129769-001	159.00
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T2000/T2000SX	2Meg	PC18-PA8317U	109.00
T2000SX/T1000LE	4Meg	PC-PA8314U	179.00
T2000SX/T1000LE	8Meg	PC14-PA8315U	349.00
T2000SXE/2200SX	2Meg	PC-PA2000U	109.00
T2000SXE/2200SX	4Meg	PC-PA2001U	179.00
T2000SXE/2200SX	8Meg	PC-PA2002U	349.00
T4400SX, SXC T6400	2Meg	PC-PA2003U	159.00
T4400SX, SXC T6400	4Meg	PC-PA2004U	229.00
T4400SX, SXC T6400	8Meg	PC-PA2005U	470.00
T4400SX,SXC T6400	16Meg	PC-PA2010U	999.00
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T3300SL	6Meg	PC-PA2008U	319.00
T3300SL	8Meg	N/A	499.00
T3300SL	16Meg	PC-PA2009U	999.00
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BRANDNAME LAPTOP MEMORY

Leading Edge D/LT 386SX	1Meg		119.00
Bondwell 8310, Plus	1Meg	23050-09100	109.00
Bondwell 8310V, SX	1Meg		109.00
NEC Prospeed 286, 386SX-16	1Meg	PC21-21	119.00
NEC Prospeed 286, 386SX-16	4Meg	PC21-22	209.00
NEC Prospeed 386	2Meg	PC31-21	159.00
NEC Prospeed 386	8Meg	PC31-22	579.00
NEC Prospeed 386SX-20	1Meg	PC43-21	139.00
NEC Prospeed 386SX-20	4Meg	PC43-22	409.00
Sharp PC-6220	1Meg	CE 6218	109.00
TI Travelmate 2000	1Meg	2568034-0001	109.00
TI Travelmate 3000	2Meg	2566996-1	89.00
Zeos 386SX Notebook	2Meg		99.00
Zenith Master Sport 386SX	2Meg	ZA-300-1	129.00
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Goldstar GS520 386SX/16	1Meg, 4Meg	S386-1M, S386-4M	99.00,249.00
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Panasonic 4410/4430	—	129	199	HP III SI	55	—	159
Panasonic 4420/4450I	89	119	199	Panasonic 4455	—	119	—
Panasonic 4450	119	—	—	NEC 90, 290	—	119	—
Epson 6000, Action Lsr.	—	115	179	NEC 95	—	139	—
Epson Action Laser II	CALL	CALL	CALL	OMS 410	119	159	249
Toshiba Page Laser 6	—	115	179	TI XL/PS17/PS35	55	—	—
Packard Bell PB9500	—	115	179	STAR LS04	129	179	269
OKi 400	—	109	—	Starscript 4	129	179	269
IBM Laser 4019, 4019E	—	—	149	DeskJet 500, 500C (256K)			64.00
Canon LBP4	129	179	—	HP Design Jet Plotter (4Meg)			179.00

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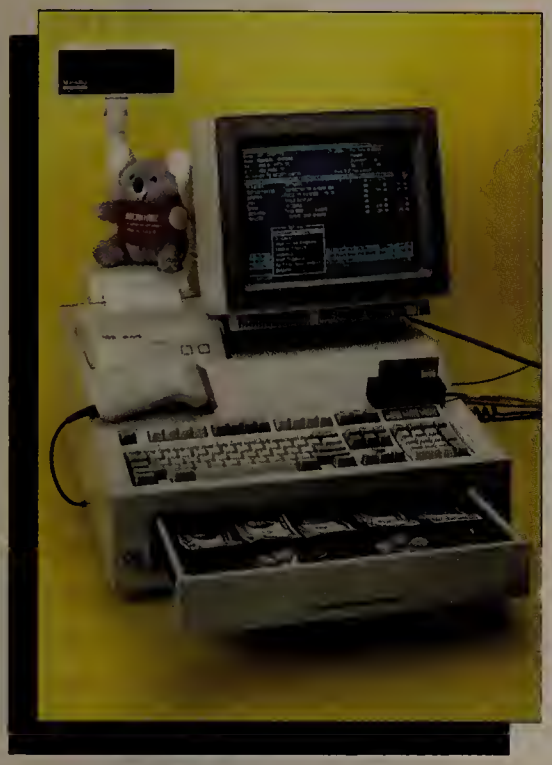

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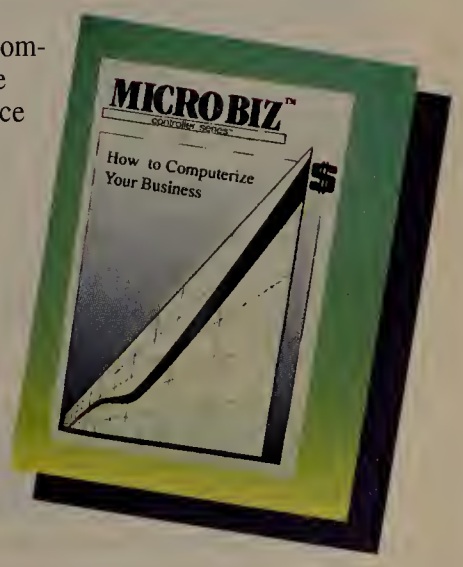

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THE HOME OFFICE

BY STEVE BASS

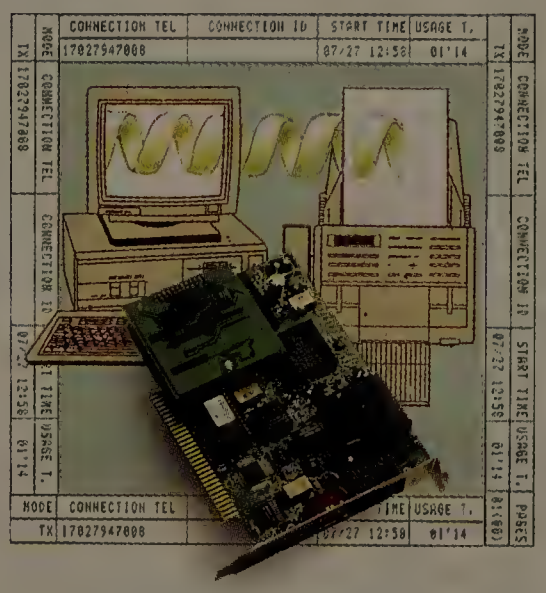
The practical guide to home/office computing

At least twice a day I'm asked, "What's your fax number?" I don't have a fax machine—I think half the stuff that's faxed can wait for regular mail delivery. But when I started needing immediate access to vital patient records, it was clearly time to change.

My first impulse was to buy a standalone fax machine. But with a computer and a laser printer already on my desk, I was just a few components away from a better and cheaper method. What's more, with the dazzling array of fax software available, I could do some neat tricks that are impossible with a standalone fax.

The most common way to turn your PC into a fax machine is with a fax-modem add-in card. The card contains a modem for data transfer along with the phone components of a fax machine. I've been happy with Intel's products before, so I tried their SatisFaxtion Modem/400. Both the fax and modem are capable of a fast 14.4-Kbps and V.42-bis error correction/data compression that could push transmission speeds as high as 19.2 Kbps across a clean line. All this for $499—or $399 on the street. Just recently, an Intel 9600-bps modem *alone* listed for $469. With prices so low on these combo boards, you'd be crazy to buy a straight modem. At the low end, Lightning Communications' LightCom 144F is marked down to about $279.

There are plenty of advantages to using these boards. For example, with a few minutes of work I can shoot off a fax from just about any DOS or *Windows* application, let the fax software do its magic, and off it goes. No standing by while a printer and manual fax machine do their stuff. And because the faxes are sent straight from the PC, they produce a far sharper image at the receiving end. I can view incoming faxes on screen, and I can save paper by choosing to print only certain pages and deleting the rest. Because the fax is really just another image file, like a PCX or TIFF, I print it on my Hewlett-Packard LaserJet using plain paper—much better for the environment and my eyes. I don't have to deal with yucky thermal paper at 11 cents a page.



LAURA TARRISH

Delrina's *WinFax Pro 2.0* and *DosFax Pro* were by far the easiest programs to use. I can also take advantage of their sophisticated fax-management capabilities, including broadcasting, mailing lists, and scheduled events. Both programs work in the background. More exciting is Delrina's *WinFax Fax Pak* with Symantec's *Norton Desktop for Windows* and Calera's *Faxgrabber*, a *Windows* OCR application that monitors incoming faxes and converts them into ASCII or any one of dozens of word processing file formats. What's more, the program then automatically launches you into the appropriate word processor. Once a document is converted, it takes less hard disk space and 50 percent less time to print.

But listen, there's a downside. Like everything else in life, faxes—especially those with lots of images—take up humongous amounts of disk space. Unless you carefully manage your files by deleting what you don't need, the megabytes will mount up fast on your hard disk.

The other problem is that you're limited to faxing computerized documents. If you have to send original paper faxes but still want the convenience of faxing from your PC, you'll need to bite the bullet and get a scanner. HP's 300-dpi, full-page ScanJet IIp—discounted to about $850—lets you scan line art in black and white, and photos in gray scale. You can also use the HP for other scanning jobs.

Now at least twice a day, *I* can say, "Hey, what's your fax number?"

Contributing Editor Steve Bass is a family therapist and president of Pasadena IBM Users Group. He can be reached on PC World Online.

WHERE TO BUY

LightCom 144F $399, Lightning Communications, 800/433-4420
Reader service no. 601

SatisFaxtion Modem/400 $499, Intel Corp., 800/538-3373
Reader service no. 602

ScanJet IIp $1295, Hewlett-Packard, 800/752-0900
Reader service no. 603

WinFax Pro 2.0, DosFax Pro, WinFax Fax Pak $119, $79, $217, Delrina Technology, Inc., 800/268-6082, 408/363-2345
Reader service no. 604

ANTHONY RUSSO

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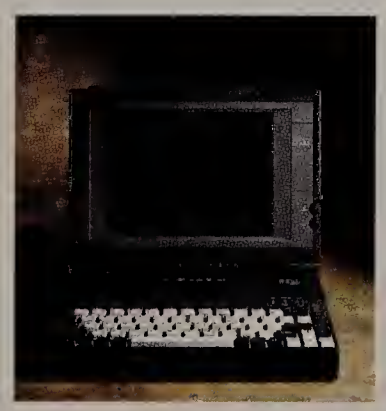

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